SpaceStation / SpaceCover / SpaceCom

Service Manual

Revision 2.0 English

B BRAUN
SHARING EXPERTISE

This Service Manual is valid for:

Designation	Part No.
SpaceStation without SpaceCom	0871 3140
SpaceStation with SpaceCom	0871 3142
SpaceCover standard	0871 3147
SpaceCover comfort	0871 3145

This Service Manual is available under the following part number:

Designation	Part No.
Service Manual SpaceStation, English	8713 9220

Languages of this Manual

The Service Manual for this unit can be supplied in the following languages:

Designation	Part No.
German	8713 9210
English (US)	8713 9220U
French	8713 9230

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Service Work

The present manual is for your information only. The possession of this manual does not authorize the performance of service work. Service tasks may only be executed by persons, who

- have received appropriate training on the system from B. Braun
- are included in the revision service
- possess the necessary test equipment and mechanical aids, and
- fulfill the personal requirements (training and knowledge).

Technical Safety Checks

The user is obliged to perform or to have performed the Technical Safety Checks on those medial products for which these checks have been prescribed by the manufacturer and to carry them out according to the indications of the manufacturer as well as the generally approved technical standards while adhering to the periods stated (§ 6 MP BetreibV).

B. Braun also recommends training on the Technical Safety Checks, or to perform at least the steps indicated in the current version of the manual, as:

- the TSC requires that the instructions in the manuals are observed
- the manuals are a reference for measurements
- depending on the unit type, the Service Program must be called which may lead to a dangerous unit condition in case of inappropriate operation. Furthermore, a special service connector may be necessary.

Current Versions

This manual version corresponds to the state when the manual was written. B Braun reserves the right to make technical modifications. The state of the revision is indicated by the index number in the footer of every page.

Revision Service

The possession of this manual does not automatically mean inclusion in the revision service. You will be included in the revision service after:

- technical training by B. Braun Melsungen or
- a written order placed with the sales department of B. Braun (fee required).

Responsibility of the Manufacturer

The manufacturer, person who assembles, installs or imports the device can only be held responsible for safety, reliability and performance if

- mounting, enhancements, new settings, changes or repairs are carried out by duly authorized persons,
- the electrical installation in the corresponding room meets the requirements of the VDE 0107, VDE 0100 part 710 or IEC 60364-7-710 and the national standards,
- the device is used in accordance with the instructions for use and the Service Manual,
- the Technical Safety Checks are performed at regular intervals,
- a current manual which corresponds to the revision state is used when carrying out maintenance, repair and service,
- the service technician takes part in the revision service,
- the technician has participated in a technical training course for the specific B. Braun unit.

Quality Management

B. Braun is certified in accordance with DIN EN ISO 9001 and ISO 13485. This certification also includes maintenance and service.

The unit has the CE label. The CE label confirms that the device corresponds to the "Directive of the Council for Medical Products 93/42/EC" of June 14, 1993.

Checks and Repair

Training may only be performed by B. Braun. The possession of the manual does not authorize the performance of repairs. The instructions on electrostatic sensitive components (ESD standards) must be observed.

After repair a device check or diagnosis is to be carried out.

Notes on ESD

Semiconductors can be destroyed by electrostatic discharge. Especially MOS components can be damaged by interference from electrostatic fields, even without discharge via contact. This type of damage is not immediately recognizable. Unit malfunctions can even occur after a longer period of operation.

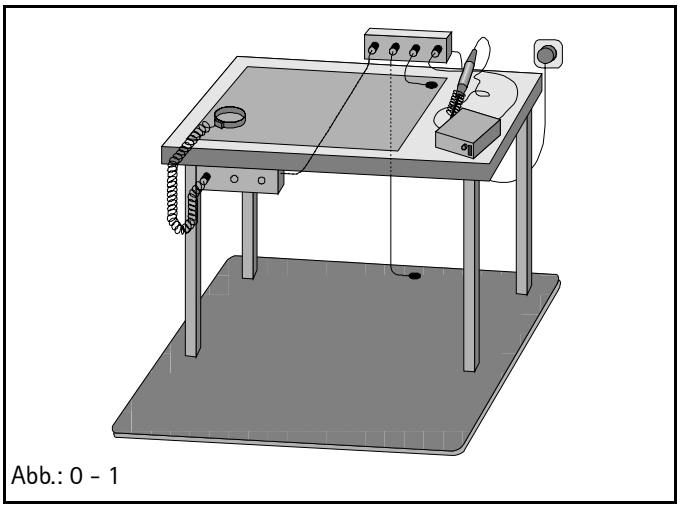


Abb.: 0 - 1

Each workstation must be equipped according to the recommendations with the necessary static protective measures, if ESD components or boards are handled.

Each workstation must be equipped with a conductive table surface. The conductive surface, the soldering iron or the soldering stations must be grounded via protective resistors.

Chairs must be of antistatic design. The floor or floor mats should be of electrically conductive material.

Personnel must wear conductive wristbands which are connected to a central ground potential via protective resistors, e.g. the ground contact of a wall outlet. Furthermore it is recommended that personnel wear cotton clothing and electrically conductive shoes to prevent electrostatic charge.

Spare Parts and Test Equipment

Only use original spare parts from the manufacturer. Do not tamper with assembly groups which can only be exchanged completely. The spare parts required are listed in Section 9.

Service personnel are responsible for the calibration of their test equipment. Original test equipment can be calibrated at the works of B. Braun. Further information is available upon request.

Setting Off

Additional notes and warnings are set off as follows:

Note

Is used for additional or special notes concerning information and working steps.

CAUTION

Is used for working steps which may result in damage to the unit, system or to a connected device.

WARNING

IS USED FOR WORKING STEPS WHICH MAY RESULT IN PERSONAL INJURY.

References to chapters are shown as follows
(see "Setting Off" ➨ pg. 0 - 8)

References to figures and tables are shown as follows
Fig.: 2 - 3 or Table 2 - 1

References to item numbers in figures are shown as follows (Fig.: 1 - 1 / Item 1)
In this case "Fig.: 1 – 1" is the figure number and "Item 1" the item number within the figure.

When the Service Manual is stored as pdf-file, these references are displayed green. Click with the mouse button on a reference to jump to the corresponding source.

Menu commands are described as:
Menu ***File***.

List of Abbreviations

Abbreviations which are not generally known, but are used in this manual, are listed below.

CAN	Controller Area Network
CE	Communauté Européenne
CS	Calibration Step
DIN	Deutsche Industrie Norm (German Industrial Norm)
EN	European Norm
ESD	Electrostatic Discharge
FuP	Function Microprocessor
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization,
ISP	Infusomat® Space
ISPS	Infusomat® Space (Silicon)
ISPP	Infusomat® Space, (PVC)
KuP	Monitoring Microprocessor
LCD	Liquid Crystal Display
MOS	Short name of the following company: MOS Technology, Inc. (Commodore Semiconductor Group)
PCA	Patient Controlled Analgesia
PSP	Perfusor® Space
SP	Space (System)
SPC	SpaceCover
SPCC	SpaceCover comfort
SPCS	SpaceCover standard
SPCO	SpaceCom
SPCT	SpaceControl
SPS	SpaceStation
TS	Trouble Shooting
UTS	Unit Test Step
TSC	Technical Safety Check

TEMP	Temperature
VDE	Verband der Elektrotechnik, Elektronik und Informationstechnik e.V. (German Association of engineers)

Contact Persons 0

Technical Training

Via local representative.

Entry for Technical Training

Application for a technical training course must be made via the responsible representative.

Ordering of Spare Parts and Test Equipment

Please contact your local B. Braun subsidary.

International Technicians (Intercompany)
Nadja Machal
Fax: +49 5661 / 75 -47 89
e-mail: nadja.machal@bbraun.com

Service Hotline

Karl Tippel, Tanja Kördel
Phone: +49 5661 / 71 - 35 25
Fax: +49 5661 / 71 - 35 26
e-mail: karl.tippel@bbraun.com
e-mail: tanja.koerdel@bbraun.com

Return of Spare Parts and Test Equipment

B. Braun Melsungen AG
Schwarzenberger Weg 73-79
Wareneingang Werk C
34 212 Melsungen
Germany

Safety Officer (§ 30 MPG)

Dr. Ludwig Schütz
e-mail: ludwig.schuetz@bbraun.com

Translation

PAS GmbH, Brückner GmbH, Germany

0 Contact Persons

For your information:

System Overview 1

Description

The modular Space system is destined for treatment of an individual patient. It is designed for application on intensive care units and in the surgery. The Space system is operated in hospitals mainly by doctors and medically trained personnel.

The SpaceStation forms together with the SpaceCover an organization system. The Space system infusion and infusion syringe pumps are attached and connected to the SpaceStation.

System Overview

The Space system is a modular design of modern infusion technology for stationary, mobile or private use. The key modules and their connection to the peripheral devices are shown in Abb.: 1 - 1.

Abb.: 1 - 1 Space system

Legende zu Abb. 1 - 1:

Item	Designation
1	SpaceCover
2	Infusion pump Infusomat® Space
3	Infusion syringe pump Perfusor® Space
4	SpaceControl
5	SpaceStation

All the pump types, Perfusor® Space, Infusomat® Space and Infusomat® Space P, as well as the other devices of the system are of modular design. Up to three pumps can be connected together using L rails on the bottom of the unit and grooves on the top. They can then be fastened to a drip stand or appropriate rail using the pole clamp.

The SpaceControl module can be used to extend operation. One single pump can be inserted onto this module. The pump is then connected via connectors to the module.

The SpaceStation module allows the set-up of a complete pump system with up to 24 pumps. Up to four pumps can be installed in every SpaceStation. The pumps are supplied with power via the integrated power supply and the built-in connectors. The pumps are connected to the optional SpaceCom via these connectors. SpaceControl can also be integrated into the system.

Up to six SpaceStations can be set-up as a column with a total of 24 pumps. SpaceStation placed next to each other can be connected via special connecting cables, if the maximum number of 24 pumps in maximum three columns is not exceeded.

SpaceCover Standard or SpaceCover Comfort forms the top of each column. Alarms are signalled by a row of LEDs and a loudspeaker in the SpaceCover Comfort.

Physical construction

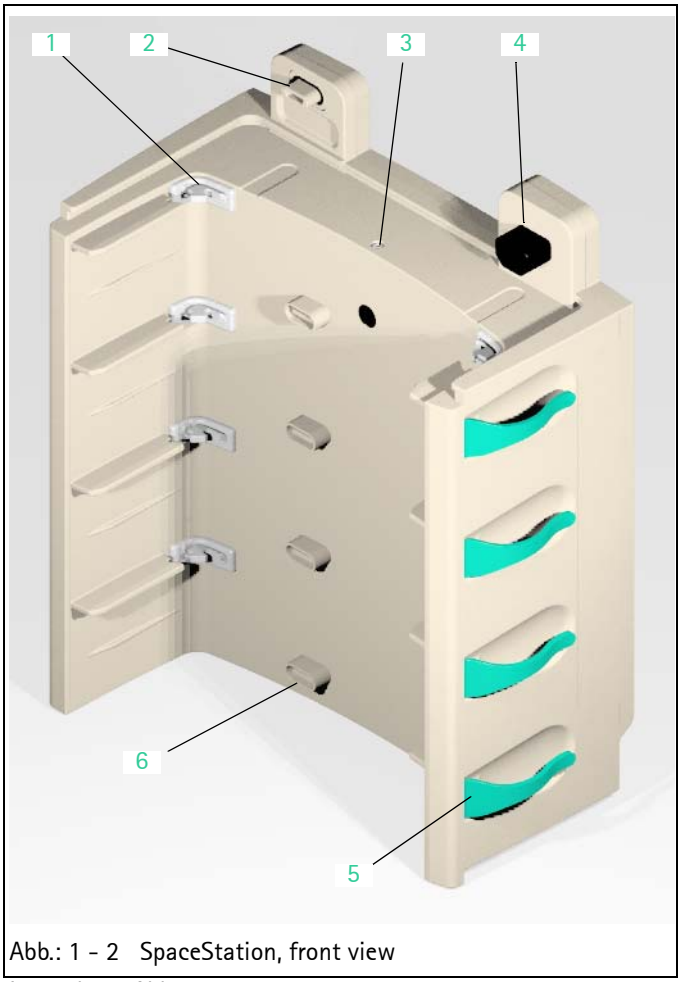


Abb.: 1 - 2 SpaceStation, front view

Legende zu Abb. 1 - 2:

Item	Designation
1	Pump lock
2	Connector "F5"
3	Module lock
4	Connector "F1B" (mains output)
5	Tube guide
6	Connector "F2D"

SpaceStation without SpaceCom

The SpaceStation consists of the housing and the housing back panel.

The power supply with power connector and power socket for another SpaceStation is installed on the right side in the housing.

The pumps in the SpaceStation are locked by 8 locking claws which are built in the housing as subsystem "module locking". This subsystem also contains the locking for a SpaceCover or another SpaceStation.

The pump is released with a release button on the left side of the housing.

The pumps are connected to the system via the connectors "F2A" to "F2D" (from top to bottom) which are integrated in the interface board, while the SpaceStation is connected to other modules via the connectors "F3", "F4" and "F5". The interface board with connectors is installed on the left side in the housing.

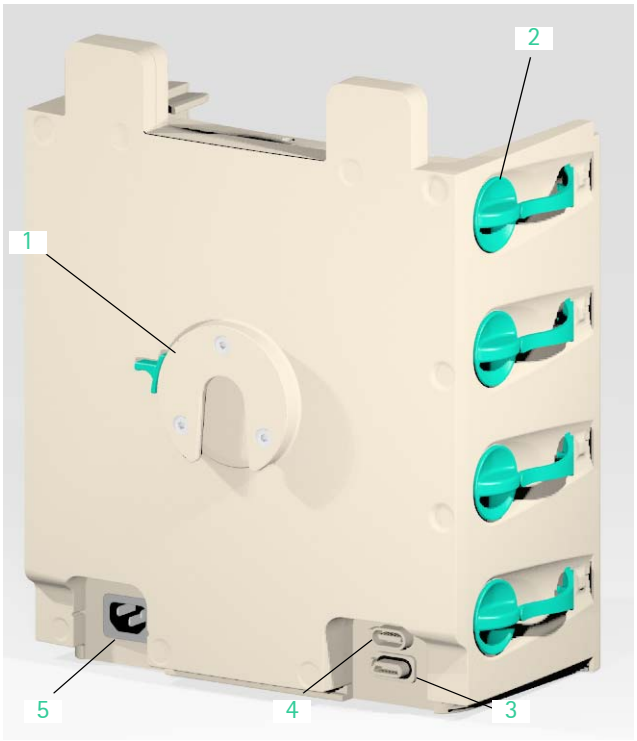


Abb.: 1 - 3 SpaceStation without SpaceCom, rear view

Legende zu Abb. 1 - 3:

ItemDesignation

1 Pole clamp guide

2 Release button

3 Connector "F3"

4 Connector "F4"

5 Connector "F1A" (power input)

Four tube guides are clipped in on the left and right housing side.

A pole clamp guide for attachment and locking of the pole clamp is located at the housing back panel.

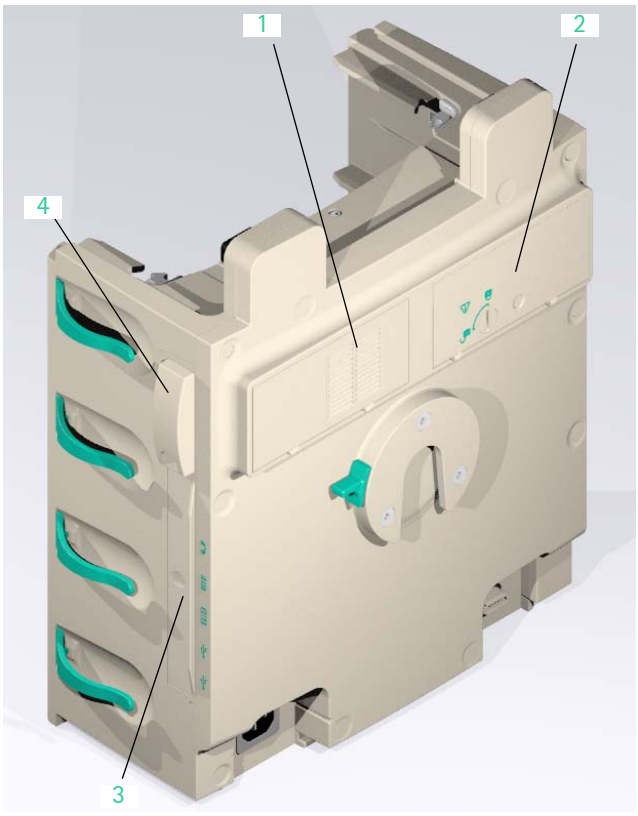


Abb.: 1 - 4 SpaceStation with SpaceCom, rear view

Legende zu Abb. 1 - 4:

Item	Designation
1	Fan grid
2	Battery compartment with battery compartment cover
3	Connector cover
4	W-LAN cover for W-LAN- module

SpaceStation with SpaceCom

The physical construction of the SpaceStation front side with SpaceCom corresponds exactly to the physical construction of the SpaceStation without SpaceCom. The only visible difference is to be found on the right side and the rear side.

Interfaces and a status- and alarm LED are located on the right-hand side behind the connector cover and the W-LAN cover. A battery module can be inserted in the battery compartment on the rear side. The opening is covered by the battery compartment cover.

A fan grid with fan is fitted on the left side of the battery compartment.

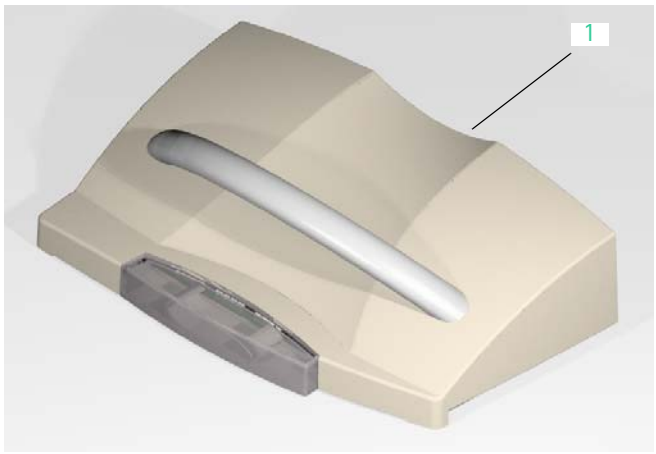


Abb.: 1 - 5 SpaceCover comfort

Legende zu Abb. 1 - 5:

Item	Designation
1	SpaceCover comfort

SpaceCover standard

The SpaceCover standard housing consists mainly of the bottom part and the upper part. A SpaceStation can be transported with the carrying handle.

SpaceCover comfort

The physical construction of the SpaceCover comfort corresponds to that of the SpaceCover standard. In addition to the SpaceCover standard the following subsystems are installed in the SpaceCover comfort:

- The battery module (as option)
  It is inserted from below in the battery compartment of the housing bottom part. The opening is covered by the battery compartment cover.
- Status and alarm display line
  installed at the front of the housing upper part.
- Operating and status display field
  at the left side of the housing upper part.

Function

SpaceStation without SpaceCom

The SpaceStation supplies the inserted pumps as well as a SpaceControl connected to the pumps with the required voltage. The voltage is generated by the integrated power supply, which is connected to the supply mains via the connector "F1A" and a mains cable or an upstream SpaceStation. The mains voltage is transmitted via the internal cabling to connector "F1B" for connection of a further SpaceStation.

The pumps are connected with connectors "F2A" to "F2D" to the SpaceStation. These connectors provide the voltage supply, distribute the addresses in the Space system via a serial interface, transfer data via a bus system (CAN bus) and transmit a staff call, which may be pending.

Another SpaceStation inserted on top or a SpaceCover is integrated in the Space system via connector "F5".

Connector "F4" is used for connecting another SpaceStation or further SpaceStation columns. An upstream SpaceStation or an upstream SpaceStation column as well as accessories that may be connected, such as a PCA button or a service connector, are connected to connector "F3".

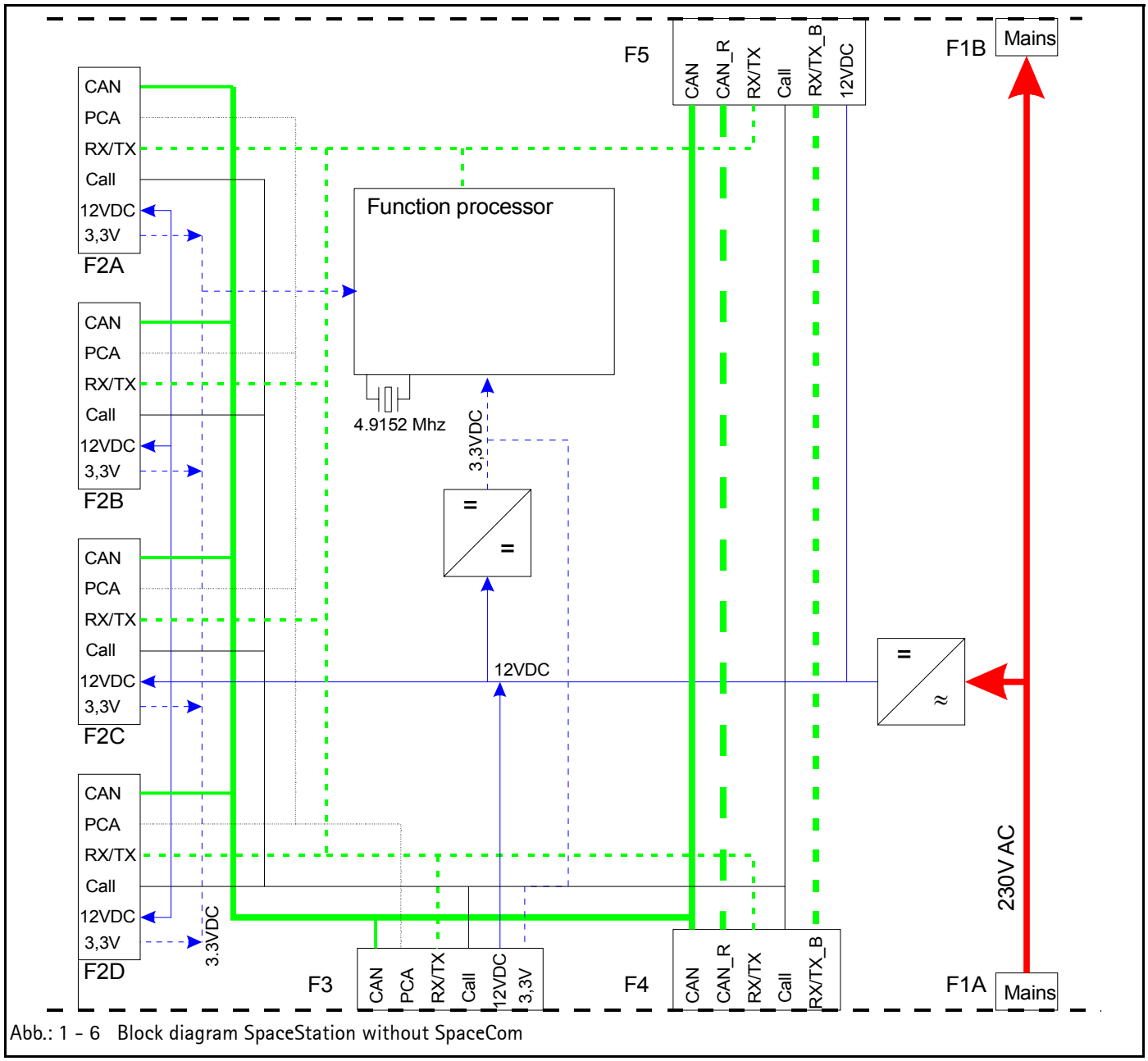


Abb.: 1 - 6 Block diagram SpaceStation without SpaceCom

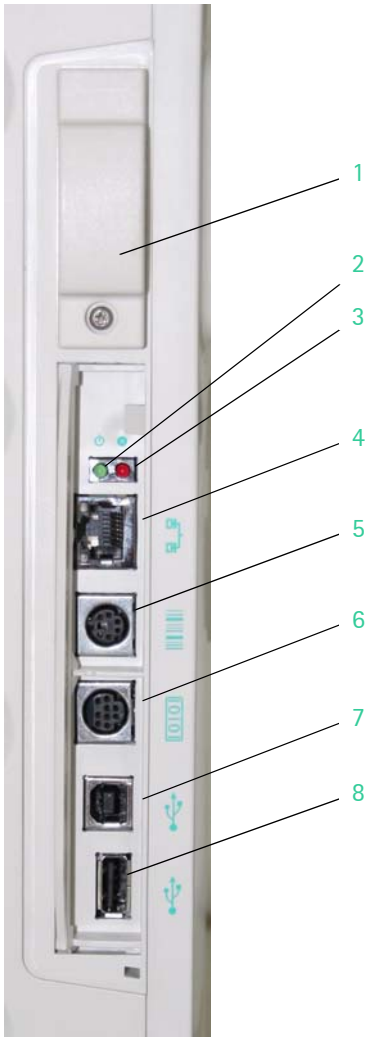


Abb.: 1 - 7

Legende zu Abb. 1 - 7:

Item	Designation
1	W-LAN slot
2	Status indicator (green)
3	Alarm indicator (red)
4	Ethernet (RJ 45) connection
5	PS/2 connection for barcode reader
6	RS232 connection
7	USB connection (slave)
8	USB connection (master)

SpaceStation with SpaceCom

The SpaceCom provides further interfaces and connections, e.g. for a barcode scanner. These interfaces are depicted in Abb.: 1 - 7.

The battery module (option) serves to maintain the functions of the SpaceStation in case of a voltage failure. An independent circuit in the battery module monitors the battery cells and controls their charge condition. The SpaceStation must be covered with a SpaceCover comfort with inserted battery module to guarantee function of the battery module in the SpaceStation with SpaceCom.

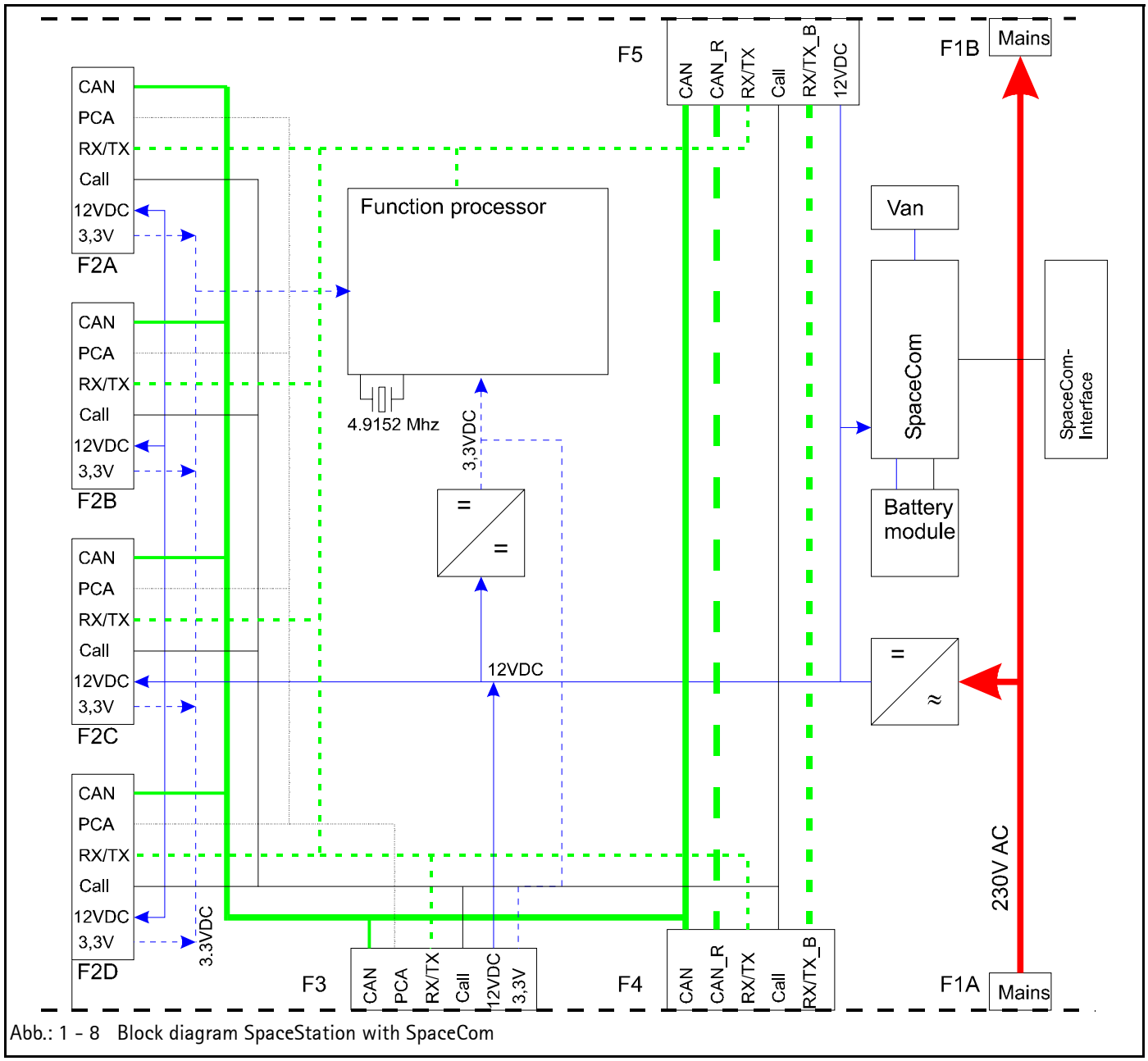


Abb.: 1 - 8 Block diagram SpaceStation with SpaceCom

SpaceCover

The SpaceCover is connected to a SpaceStation with connector "D1".

With the SpaceCover standard this connector is used to connect the CAN bus and a serial interface.

In the SpaceCover comfort this connector provides the voltage supply, transmits a unique address in the Space system via a serial interface, transfers data via a bus system (CAN bus) and transmits a staff call, which may be pending.

The internal electronics controls the operator and status display field, the loudspeaker as well as the status and alarm display line. The status and alarm display line displays the collected messages of the pumps in a column. The brightness is controlled dependent on the environment.

The voltage supplied is converted to the internal voltages required through a voltage transforming and monitoring circuit on the processor PCB.

An independent circuit in the battery module monitors the battery cells and controls their charge condition.

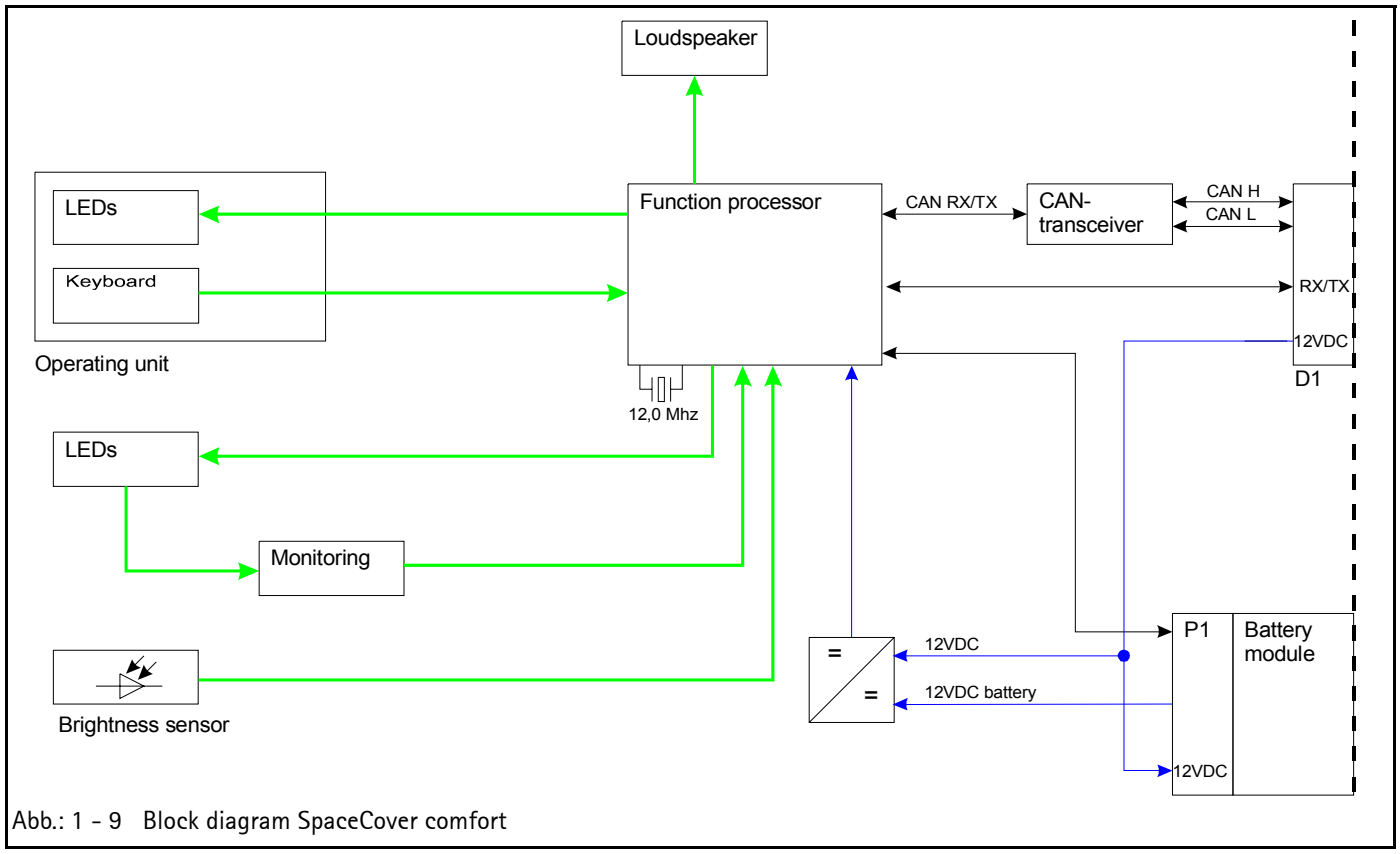


Abb.: 1 - 9 Block diagram SpaceCover comfort

Unit Software

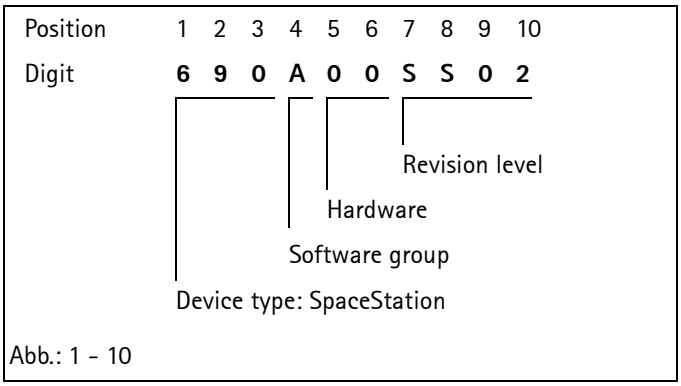


Abb.: 1 - 10

Approved Software Versions for SpaceStation

690A00SS01

- Basic software

690A00SS02

- Improved functions

Approved Software Versions for SpaceCom

695C000001 / 695C000002

- Basic software

695C010003

- Adapted to hardware changes

695D010001

- Adapted to the pump software

695E010001

- Adapted to the pump software

Approved Software Versions for SpaceCover comfort

692A000001

- Basic software

692A000002

- Improved functions

692A000003

- Expanded functions

692C000001

- Adapted to the pump software

692E000001

- Adapted to the pump software

Software Update

The instructions for updating the software are supplied with the software itself.

CAUTION

If the device is disconnected while the software is being updated or the device or PC is switched off, a component of the software may be seriously damaged so that repairs are no longer possible. In such a case the software can no longer be updated via the PC and the device must be returned to B. Braun.

Service Program

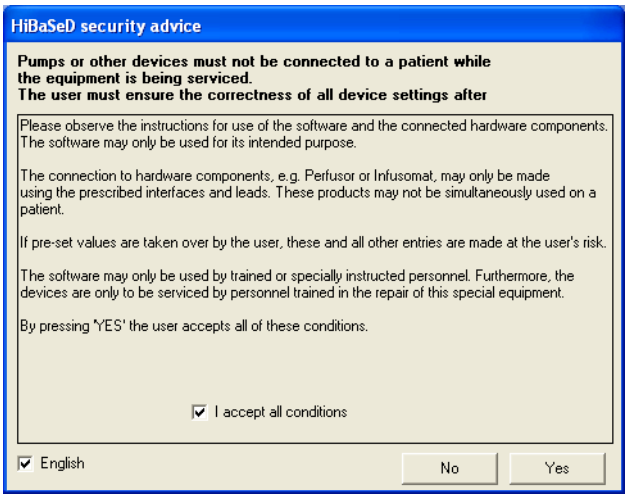

HiBaSeD security advice
Pumps or other devices must not be connected to a patient while the equipment is being serviced.
The user must ensure the correctness of all device settings after
Please observe the instructions for use of the software and the connected hardware components. The software may only be used for its intended purpose.
The connection to hardware components, e.g. Perfusor or Infusomat, may only be made using the prescribed interfaces and leads. These products may not be simultaneously used on a patient.
If pre-set values are taken over by the user, these and all other entries are made at the user's risk.
The software may only be used by trained or specially instructed personnel. Furthermore, the devices are only to be serviced by personnel trained in the repair of this special equipment.
By pressing 'YES' the user accepts all of these conditions.
I accept all conditions
English
No
Yes

Abb.: 1 - 11

Approved Version

Note

Please note that text and / or functions of the Service Program may change depending on the software version. The following screen illustrations are only examples and represent the state when the manual was printed.

- 0.0.28.0
- 1.3.5
- 1.5.0
- 2.0.1

Connection

Before starting the Service Program the PC is to be connected to the device via the RS232 SP interface cable.

Starting the Service Program

Installation and further operation of the Service Program is described in its separate instructions for use.

1. Start the „HiBaSeD.exe" program (History, Barcode, Service, Drug list) on the PC. The Service Program is loaded and started and the initial window of the Service Program is displayed.
2. Read the notes carefully.
3. Mark the field "I accept all conditions" and then the field "Yes" to confirm that you have read the notes.

Note

Click the field "English" to switch the language of the notes over to English.

4. Enter the password and confirm it by clicking the field "Start".

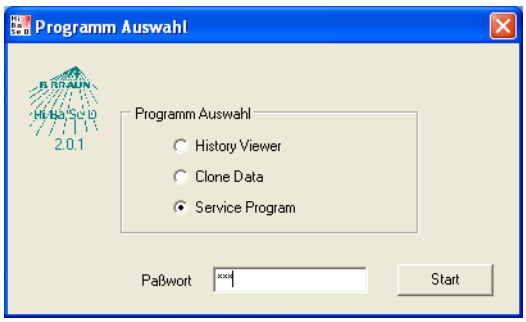


Abb.: 1 - 12

The Service Program checks the PC interfaces for connected devices of the Space system. Units that were found are displayed for a short moment on the screen.

Abb.: 1 - 13

Note

At present a connected SpaceStation is not displayed.

The work window of the Service Program appears on the screen. All devices recognized are listed in the left column.

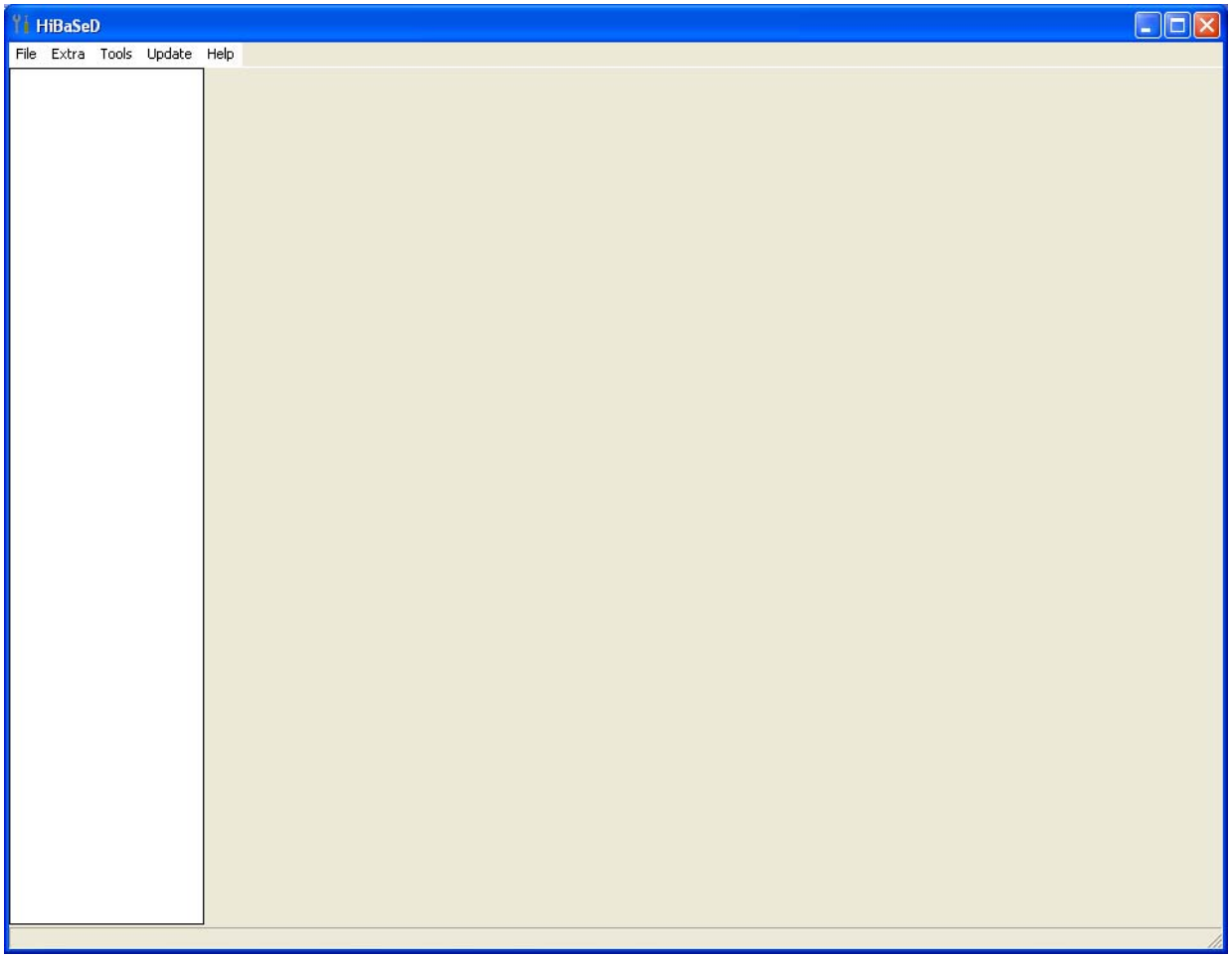


Abb.: 1 - 14

Abb.: 1 - 15

Service Program Version

1. Open the "HiBaSeD" window via ***Help*** ➨ ***Info ...***. The current version of the Service Program is shown in this window.
2. Close the window by clicking "OK".

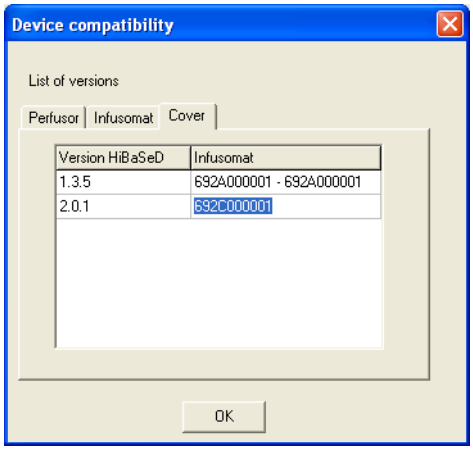


Abb.: 1 - 16

Compatibility List

1. Open the "Unit - Compatibility" window via ***Help*** ➨ ***Decice compatibility***. This window displays the compatibility of the HiBaSeD-version and the unit software version.
2. Close the window by clicking "OK".

Quit the Service Program

1. Exit the Service Program via ***File*** ➨ ***Exit***.

SpaceOnline

(only required with SpaceStation with SpaceCom)

Approved Version

Note

Please note that text and / or functions of the SpaceOnline Program may change depending on the software version. The following screen illustrations are only examples and represent the state when the manual was printed.

- 1.2.0

Connection

Before starting the SpaceOnline Program the PC is to be connected to the device via the RJ45 cross-over interface cable. In addition the PC-LAN connection must be configured with the correct IP address (e.g. 192.168.100.1). Make sure that the first three digit blocks, e.g. 192.168.100.xxx, of PC and the SpaceCom are identical.

Starting the SpaceOnline Program

1. Start the Internet Browser on your PC and enter the IP-address of the SpaceCom. The SpaceOnline start screen appears.

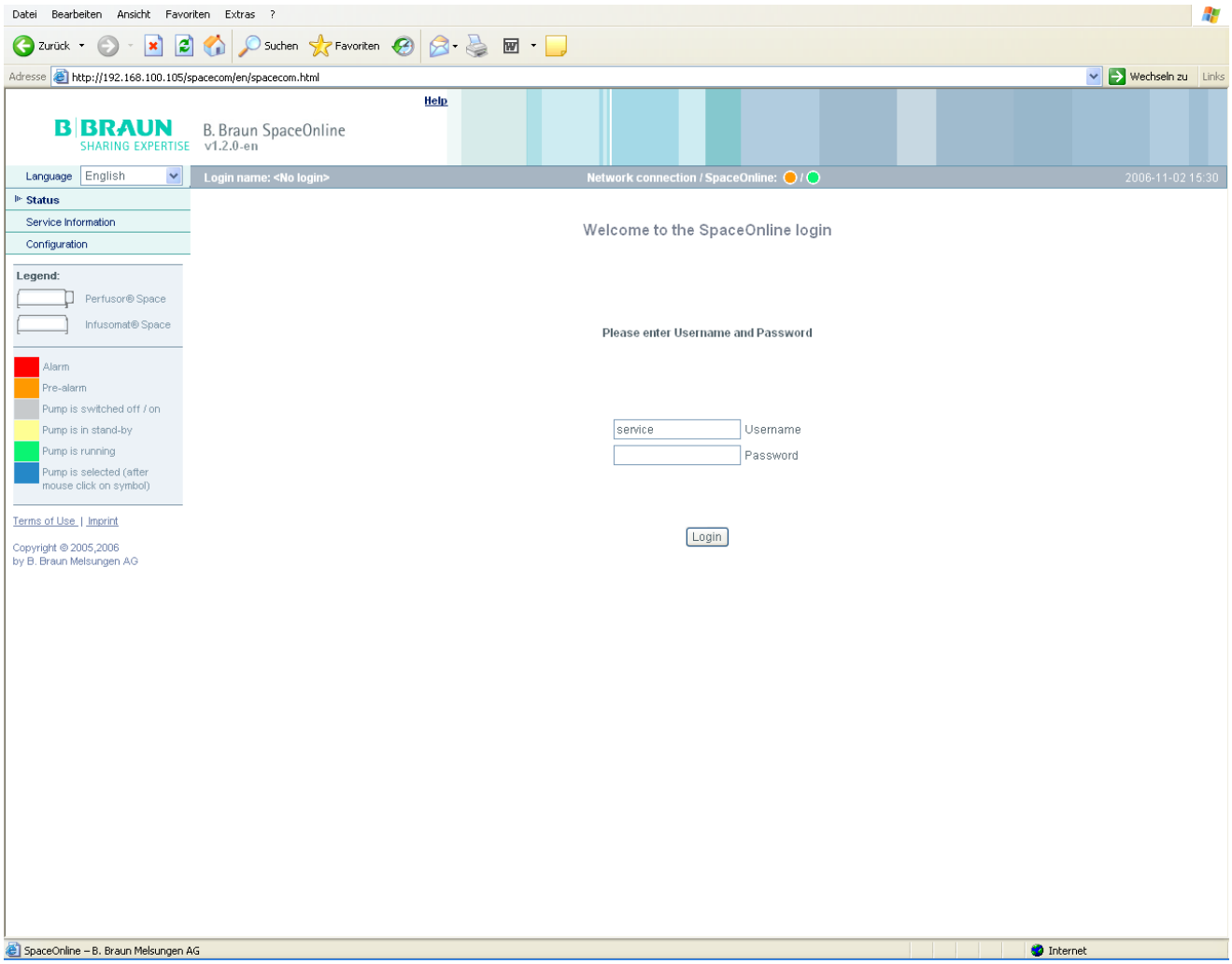


Abb.: 1 - 17

Program Version

The program version is displayed in the header of the start screen.

Operation

The instructions for use contain a more detailed description of operation.

Exit the SpaceOnline Program

1. Close the Internet Browser.

BCCshow

Approved Version

Note

Please note that text and / or functions of the BCCshow Program may change depending on the software version. The following screen illustrations are only examples and represent the state when the manual was printed.

- 3.26

Connection

Before starting the BCCshow Program the PC is to be connected to the device via the RS232 SPCO (crossed) interface cable.

Connection Settings

1. Open the „BCCshow.ini" file after having installed the program.
2. Check the line „ComPort=X".
3. Substitute the X for the current ComPort number, e.g. "1".

Starting the BCCshow Program

1. Start the BCCshow program. The start screen appears.
2. Invoke the display of the connected system via ***System*** ➨ ***Start***.
   The SpaceStation with all pumps inserted and the set data is displayed.

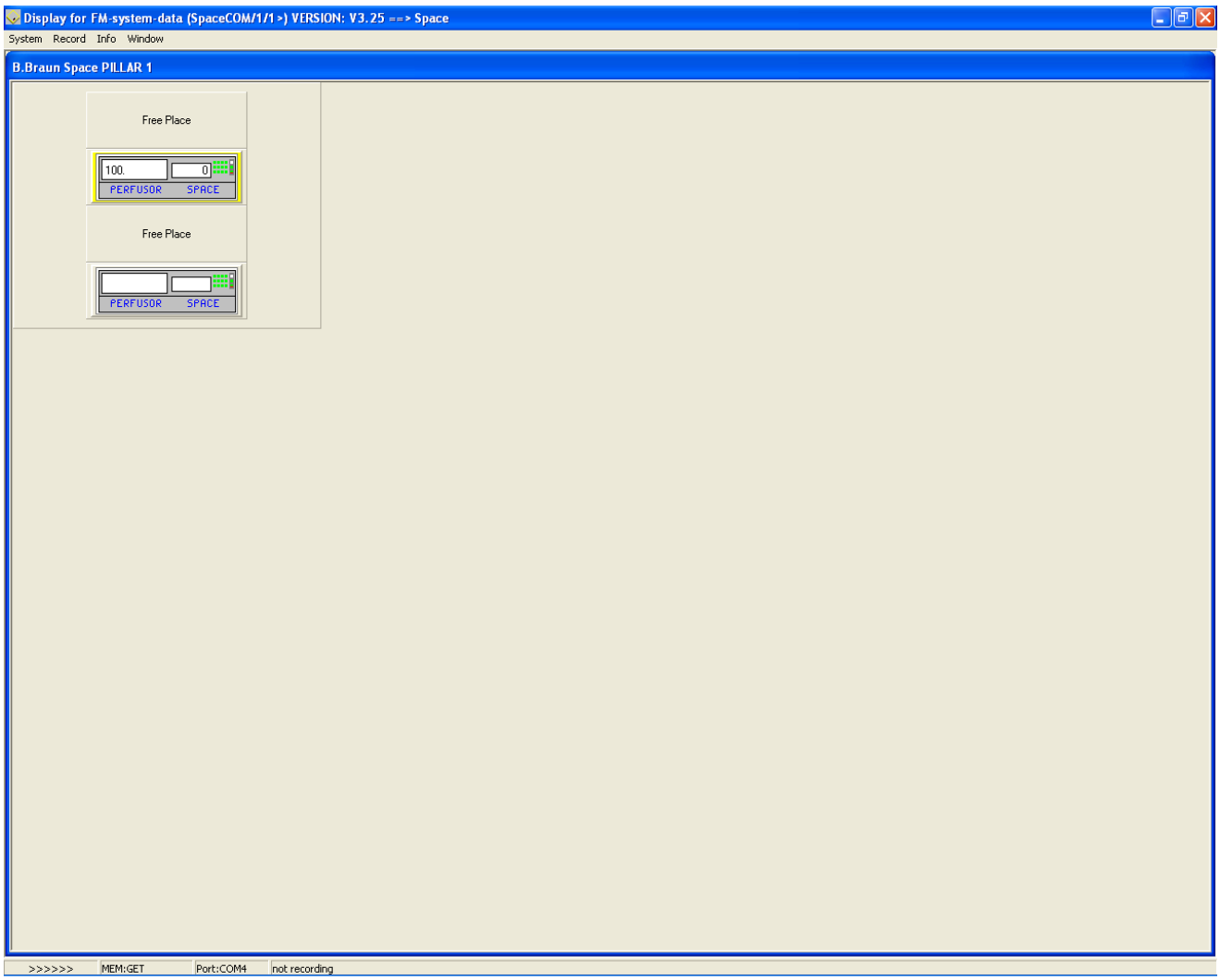


Abb.: 1 - 18

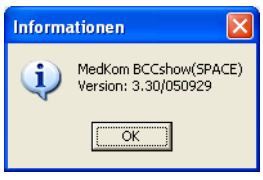


Abb.: 1 - 19

Program Version

1. Open the „Information" window via ***Info*** ➨ ***Version***. The current program version is displayed in this window.
2. Close the window by clicking "OK".

Technical Data

All technical data is indicated in the instructions for use.

Options

The functions of the individual options are detailed in the instructions for use.

SpaceStation with SpaceCom

Designation	Part No.:
SpaceCom retrofit kit.	0871 3160

The optional SpaceCom provides additional interfaces, such as Ethernet RJ45, RS232. A SpaceStation without SpaceCom can be upgraded with this retrofit kit.

Accessories

Designation	Part No.
Charger SP battery charging station	0871 3170
Connecting cable staff call SP	0871 3232
Power supply cable 12 V for ambulance cars	0871 3231
Interface cable CAN SP	0871 3230
Interface cable RS232 SP	0871 3234
Interface cable RS232 SPCO (crossed)	0871 3237
Converter RS232 SP	0871 3238
W-LAN card	0871 3184
Connecting cable SP 60cm for connecting two columns	0871 3210
Connecting cable SP 120cm for connecting two columns	0871 3215
PoleClamp SP The PoleClamp SP is a holder for one or several Space system pumps.	0871 3130
Universal clamp	3452 1151

For your information:

Unit Diagnosis / Calibration 2

General

WARNING

WHILE TESTING THE UNIT AND TROUBLE SHOOTING THE OPERATOR/SERVICE TECHNICIAN MUST WORK WITH VOLTAGES UP TO 115 / 230 V AC. THESE VOLTAGES MAY CAUSE INJURIES WHICH ARE DANGEROUS TO LIFE AND LIMB. THE NATIONAL AND INTERNATIONAL SAFETY REGULATIONS ARE TO BE ADHERED TO.

Before each disassembly of a unit subsystem check the connectors, plug contacts and connections for corrosion and tight fit. These fault types are not described again in the following trouble shooting list.

The following equipment is necessary for testing the SpaceStation without SpaceCom and/or performing trouble shooting:

- PC
- Service connector SP
- Service Program HiBaSeD
- Interface cable RS232 SP
- Space system pump
- SpaceCover comfort (for unit diagnosis of the SpaceStation)

The following additional equipment is necessary for testing the SpaceStation with SpaceCom and/or performing trouble shooting:

- Interface cable CAN SP
- Interface cable RS232 SPCO (crossed)
- Interface cable RJ45 cross-over

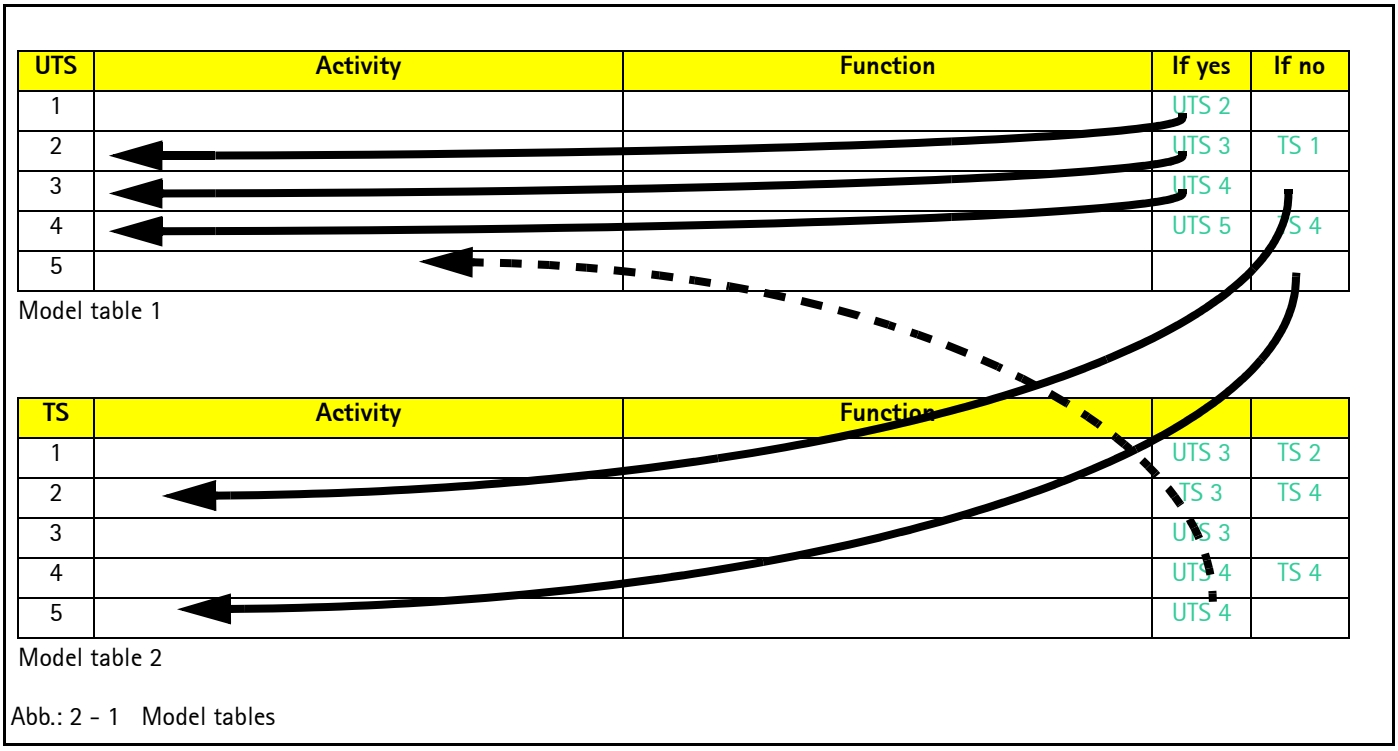
CAUTION

Take special care when carrying out measurements on an open and switched-on unit. Short circuits and wrong measuring methods can cause serious damage to or destroy the subsystems of the device.

The unit check, calibration and trouble shooting are subdivided into numbered working steps (Unit Test Step UTS, Calibration Step CS, Trouble Shooting TS) and are based on each other.

Beginning with UTS 1 the operation described here has to be executed. The consequences of the steps performed are listed in the "Function" column. If the result corresponds to the consequence, the working step must be carried out to which reference is made in the column "If yes". If the result does not correspond with the function described, the working step in column "If no" is to be executed.

One example is given in Abb.: 2 - 1.



UTS	Activity	Function	If yes	If no
1			UTS 2	
2			UTS 3	TS 1
3			UTS 4	
4			UTS 5	TS 4
5				

Model table 1

TS	Activity	Function		
1			UTS 3	TS 2
2			TS 3	TS 4
3			UTS 3	
4			UTS 4	TS 4
5			UTS 4	

Model table 2

Abb.: 2 - 1 Model tables

Steps for which additional information is required are described hereafter in detail.

Alarms and Error Codes

SpaceStation without SpaceCom

Neither alarms nor error codes are actually displayed on the SpaceStation without SpaceCom.

SpaceStation with SpaceCom

	Alarm	Possible Cause	Fault Clearance
1	SpaceComAlarm indicator (red) is on	SpaceCom is still starting	
2	SpaceComAlarm indicator (red) flashes	A serious internal fault was detected in the system	Carry out a device check (see „Device Check" ➨ S. 2 - 4)

Table 2 - 1 Alarms on the SpaceCom

SpaceCover comfort

	Alarm	Possible Cause	Fault Clearance
1	One of the diodes of the status- and alarm display line is on or flashes	A message or an alarm of a pump is displayed	
2	The status indicator (on the right-hand side of the On-/Off-button) flashes red	System not properly configured	Check configuration
3	The status indicator (on the right-hand side of the On-/Off-button) lights up red	A serious internal fault was detected in the system	Carry out a device check (see „Device Check" ➨ S. 2 - 4)
4	The first LED in the top charge condition display of the operator and status display field of the SpaceCover comfort flashes yellow	Battery module of theSpaceCover comfort nearly discharged (type: pre-alarm)	Connect device to voltage supply
5	The first LED in the bottom charge condition display of the operator and status display field of the SpaceCover comfort flashes yellow	Battery module of theSpaceCom nearly discharged (type: pre-alarm)	Connect device to voltage supply
6	The first LED in the top charge condition display of the operator and status display field of the SpaceCover comfort flashes red	Battery module of the SpaceCover comfort discharged	Connect device to voltage supply
7	The first LED in the bottom charge condition display of the operator and status display field of the SpaceCover comfort flashes red	Battery module of the SpaceCom discharged	Connect device to voltage supply

Table 2 - 2 Alarms of the SpaceCover comfort (Part 1 of 2)

	Alarm	Possible Cause	Fault Clearance
8	The first LED in the top charge condition display of the operator and status display field of the SpaceCover comfort lights up red	Battery module of the SpaceCover comfort defective or too old	Replace battery module
9	The first LED in the bottom charge condition display of the operator and status display field of the SpaceCover comfort lights up red	Battery module of the SpaceCom defective or too old	Replace battery module

Table 2 - 2 Alarms of the SpaceCover comfort (Part 2 of 2)

The Most Important Error Modes

The following list specifies the most important error modes and their clearance.

Note

The error list is in preparation.

Device Check

UTS	Activity	Function	If yes	If no
1	Detach or loosen all connections and devices from the SpaceStation		UTS 2	
2	Connect the SpaceStation via the mains cable to the mains		UTS 3	
3	Insert one pump after the other in each slot	The pump is locked	UTS 4	TS 1
4		The pump can be released at any slot	UTS 5	TS 1
5	Plug service connector SP on connector "F3"		UTS 6	
6	Insert the pump in the topmost slot and trigger a staff call	The red LED of the service connector SP lights up	UTS 7	TS 4
7	Remove the pump while it is switched on	The red LED of the service connector SP goes out	UTS 8	TS 4
8	Insert the switched-on pump in each other slot	The red LED of the service connector SP lights up when the lock engages	UTS 9	TS 4
9	A SpaceCover comfort with SpaceStation is installed		UTS 10	UTS 20
10	Mount and lock the SpaceCover comfort on the SpaceStation	All luminous fields of the status and alarm display line light up briefly during the self-test	UTS 11	TS 5
11		A short audible alarm sounds	UTS 12	TS 7

Table 2 - 3 Device check (Part 1 of 2)

UTS	Activity	Function	If yes	If no
12		All LEDs of the operator and status display field light up briefly	UTS 13	TS 5
13		The green LED on the operator and status display field lights up	UTS 14	TS 5
14		When the battery module is inserted the charge condition is displayed in the top charge status display of the operator and status display field	UTS 15	TS 9
15	Change loudness of the alarm tone	The loudness changes	UTS 16	TS 11
16	Insert pump in the topmost slot and start an infusion	The infusion is displayed green in the status and alarm display line	UTS 17	TS 13
17	Insert the pump in each other slot and start an infusion	The infusion is displayed green in the status and alarm display line	UTS 18	TS 14
18	Trigger an alarm on the pump	The alarm is displayed red (orange in case of a prealarm) in the status and alarm display line	UTS 19	TS 15
19	If a SpaceCom is integrated in the SpaceStation carry out the device check according to Chapter „Device Check SpaceCom" (➨ S. 2 - 5).			UTS 20
20	Detach or loosen all connections and devices from the SpaceStation		This step terminates the device check	

Table 2 - 3 Device check (Part 2 of 2)

Device Check SpaceCom

GS-COM	Activity	Function	If yes	If no
1	Disconnect the SpaceStation from the mains and switch off a SpaceCover comfort which may be fitted		UTS-COM 2	
2		A battery module is installed in the SpaceStation	UTS-COM 3	UTS-COM 4
3	Insert a battery module in the SpaceStation		UTS-COM 4	
4	Connect the SpaceStation to the mains	Fan in the housing back panel starts running for appr. 1 sec.	UTS-COM 5	TS 17
5		The status indicator (green) of the SpaceCom lights up	UTS-COM 6	TS 20
6		The alarm indicator (red) of the SpaceCom lights up for approx. 1 minute and goes out	UTS-COM 7	TS 20

Table 2 - 4 Device check SpaceCom (Part 1 of 2)

GS-COM	Activity	Function	If yes	If no
7		The charge condition of the battery module is displayed in the bottom charge condition display of the operator and status display field of the SpaceCover comfort	UTS-COM 8	TS 22
8	Connect the SpaceStation with the interface cable RJ45 cross-over via the Ethernet (RJ45) connection of the SpaceCom to a PC		UTS-COM 9	
9	Start the SpaceOnline Program (see „SpaceOnline" ➨ S. 1 - 17)	The data of the SpaceStation and the pumps inserted is displayed on the PC monitor	UTS-COM 10	TS 20
10	Connect the SpaceStation with the interface cable RS232 SPCO (crossed) via the RS 232 connector of the SpaceCom to a PC		UTS-COM 11	
11	Start the BCCshow Program (see „BCCshow" ➨ S. 1 - 19).	The data of the SpaceStation and the pumps inserted is displayed on the PC monitor	UTS-COM 12	TS 20
12	Detach or loosen all connections and devices from the SpaceStation		This step terminates the device check	

Table 2 - 4 Device check SpaceCom (Part 2 of 2)

Trouble Shooting

Note

The following trouble shooting cannot be carried out independently. It is based on the precise observance of the steps for the device check (see „Device Check" ➨ S. 2 - 4). From there reference is made to the corresponding trouble shooting steps.

TS	Activity	Function	If yes	If no
1	Replace the module lock		UTS 3	
2	Check the voltage 12 V (-0.6 V / +3.5 V) DC at the interface board plug contacts (connection power supply – interface board)	The voltage is measured	TS 4	TS 3
3	Replace power supply		UTS 4	
4	Replace interface board		UTS 4	

Table 2 - 5 Trouble shooting (Part 1 of 2)

TS	Activity	Function	If yes	If no
5	Exchange processor PCB SPCC	All luminous fields of the status and alarm display line light up briefly during the self-test All LEDs of the operator and status display field light up briefly The green LED on the operator and status display field lights up	UTS 10	TS 6
6	Replace interface board in the SpaceStation		UTS 10	
7	Replace loudspeaker	A short audible alarm sounds	UTS 14	TS 8
8	Exchange processor PCB SPCC		UTS 14	
9	Replace interface board in the SpaceStation	The charge state of the battery module is displayed on the operator and status display field	UTS 15	TS 10
10	Exchange the housing upper part SPCC		UTS 15	
11	Exchange the housing upper part SPCC	The loudness changes	UTS 16	TS 12
12	Exchange processor PCB SPCC		UTS 16	
13	Exchange processor PCB SPCC	The infusion is displayed green in the status and alarm display line	UTS 18	TS 14
14	Replace interface board in the SpaceStation		UTS 18	
15	Exchange processor PCB SPCC	The alarm is displayed red in the status and alarm display line	UTS 20	TS 16
16	Replace interface board in the SpaceStation		UTS 20	
17	Pull off the fan connecting cable on the SPCO board and trigger the fan with 12 V DC. Connect the (+) pole to the connector pole with red wires and the (-) pole to the connector pole with black wires	The fan is running	TS 19	TS 18
18	Exchange fan		UTS-COM 5	
19		The status indicator (green) of the SpaceCom lights up	TS 20	TS 21
20	Replace the SPCO board		UTS-COM 5	
21	Replace interface board in the SpaceStation		UTS-COM 5	
22	Replace battery module of the SpaceStation	The charge condition of the battery module is displayed in the bottom charge condition display of the operator and status display field of the SpaceCover comfort	UTS-COM 8	TS 23
23	Replace the SPCO board	The charge condition of the battery module is displayed in the bottom charge condition display of the operator and status display field of the SpaceCover comfort	UTS-COM 8	TS 24
24	Replace interface board in the SpaceStation		UTS-COM 8	

Table 2 - 5 Trouble shooting (Part 2 of 2)

For your information:

Disassembly / Assembly SpaceStation 3

3.1 General on the SpaceStation without SpaceCom

Remarks on Disassembly / Assembly of the SpaceStation without SpaceCom

WARNING

DURING DISASSEMBLY AND ASSEMBLY THE OPERATOR/SERVICE TECHNICIAN MUST WORK WITH VOLTAGES UP TO 115 / 230 V AC. THESE VOLTAGES MAY CAUSE INJURIES WHICH ARE DANGEROUS TO LIFE AND LIMB. THE NATIONAL AND INTERNATIONAL SAFETY REGULATIONS ARE TO BE ADHERED TO. THE MAINS CABLE IS TO BE REMOVED.

Before disassembling the unit, the system must be checked (see „Device Check" ➨ S. 2 - 4) to isolate the part to be exchanged.

All necessary steps to disassemble or dismount the complete unit with all its subsystems and spare parts are detailed in the following description. Steps that are not necessary can be skipped.

Note

Special screws for plastic housings are used in this unit. Pay attention to the corresponding notes when you fit the screws.

Service Parts and Screw Kit

All small parts, such as cover caps, are contained in a SpaceStation service part kit.

Designation	Ord. No.
Service part kit SpaceStation	3477 4335

with:
- Release button
- Release seal
- Seal M-2K
- Cover cap for housing
- Cover cap for handle
- Housing foot SPS
- Seal, mains F1A
- Pole clamp lever
- Pole clamp spring
- O-ring 6.07 x 1.78
- O-ring 12.0 x 2.0

All screws used in the device are included in a SpaceStation screw kit.

Designation	Ord. No.
Screw kit SpaceStation	3477 4343

- Screw EJOT 30x9 WN 5452 TORX 10IP A2
- Screw EJOT 30x12 WN 5452 TORX 10IP A2
- Screw EJOT 30x16 WN 5451 TORX 10IP A2
- Screw M5x45 A2 DIN912 TORX 25
- Countersunk screw M5x12 TORX 25
- Fillister-head screw M5x12 EN-ISO14583 A2
- Nut M4
- Insulating washer M3
- Washer M4
- Washer M5
- Serrated lock washer M4
- Serrated lock washer M5

3.2 Tube Guide

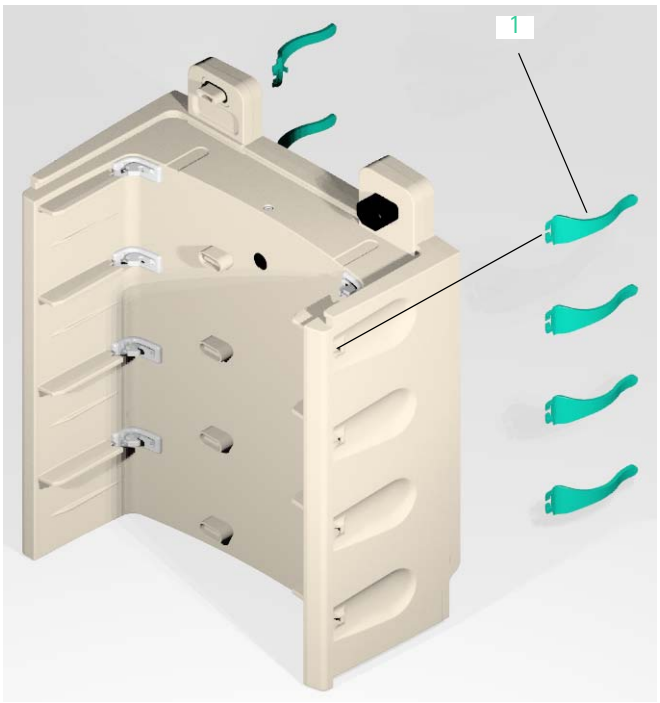


Abb.: 3 - 1

Legende zu Abb. 3 - 1:

Item	Designation
1	Tube guide

Designation	Ord. No.
Tube guide SPS (20 pieces)	3477 4394

Disassembly

1. Press the rotary knob of the tube guide out and pull the tube guide (Abb.: 3 - 1 / Item 1) out of the housing.

Note

When the tube guide is broken, remove the remaining parts from the housing.

3.3 Pole Clamp Guide

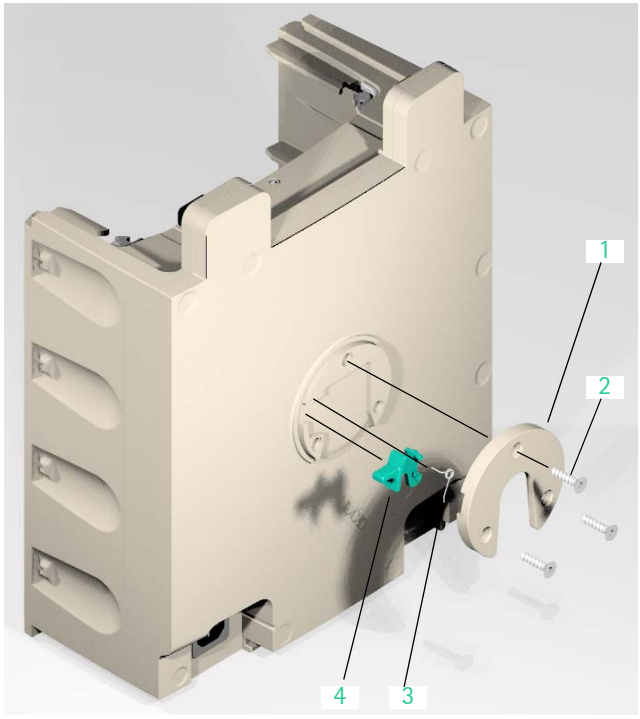


Abb.: 3 - 2

Legende zu Abb. 3 - 2:

ItemDesignation

1 Pole clamp guide

2 Countersunk screw M5x12 TORX 25

3 Pole clamp spring

4 Pole clamp lever

Designation	Ord. No.
Pole clamp guide SPS	3452 1135

Pole clamp lever

(see „Service Parts and Screw Kit“ ➨ S. 3 - 2)

Pole clamp spring

(see „Service Parts and Screw Kit“ ➨ S. 3 - 2)

Screws

(see „Service Parts and Screw Kit“ ➨ S. 3 - 2)

Disassembly

1. Loosen three screws (Abb.: 3 - 2 / Item 2) and remove the screws together with the pole clamp guide (Abb.: 3 - 2 / Item 1).
2. Remove pole clamp lever (Abb.: 3 - 2 / Item 4) and pole clamp spring (Abb.: 3 - 2 / Item 3).

3.4 Housing Back Panel

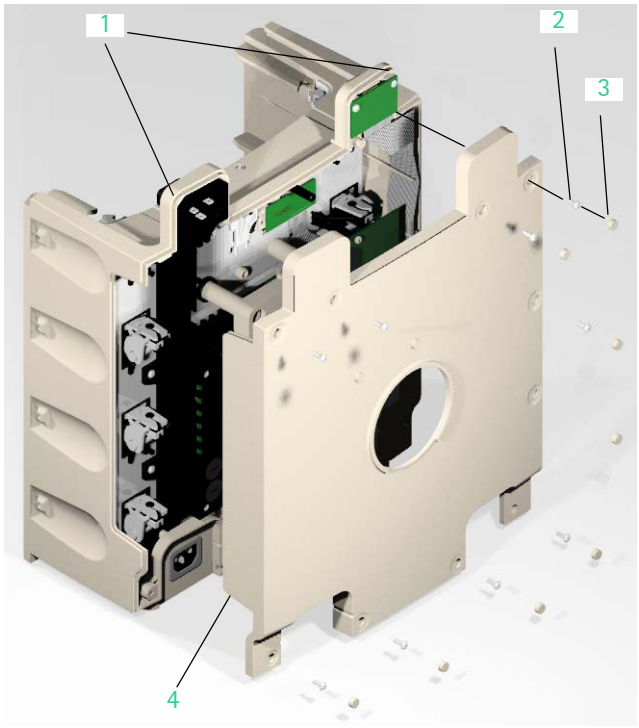


Abb.: 3 - 3

Legende zu Abb. 3 - 3:

ItemDesignation

1 Housing notch

2 Screw EJOT 30x9 WN 5452 TORX 10IP A2

3 Cover cap

4 Housing back panel

Designation **Ord. No.**

Housing back panel SPS 3452 1089

Cover cap and screws

(see „Service Parts and Screw Kit“ ➡ S. 3 - 2)

Disassembly

1. Pierce ten cover caps (Abb.: 3 - 3 / Item 3) with a screwdriver and pull caps out.
2. Loosen nine screws (Abb.: 3 - 3 / Item 2) and remove screws carefully together with the back panel (Abb.: 3 - 3 / Item 4) from the housing.

Note

Lift the housing back panel carefully at the bottom over the seat of the pole clamp guide and push the back panel over the housing notch (Abb.: 3 - 3 / Item 1).

3.5 Device Bracket

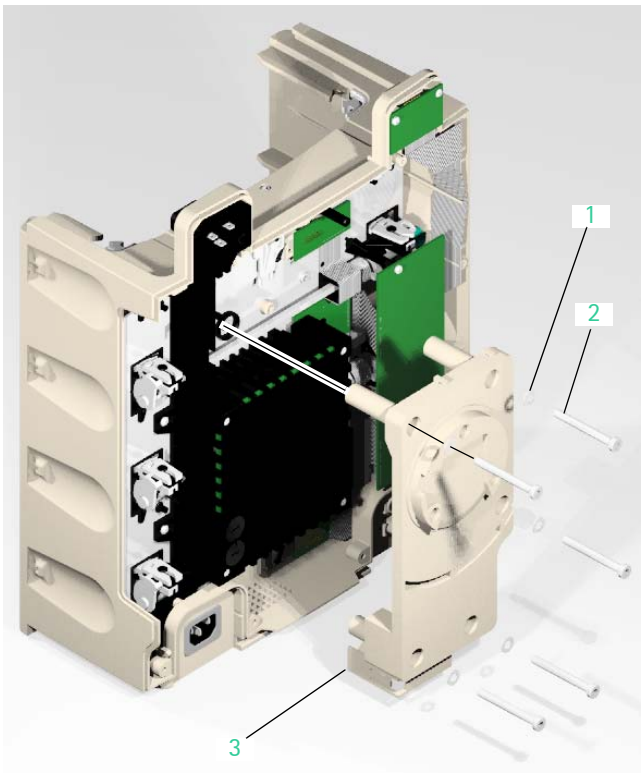


Abb.: 3 - 4

Legende zu Abb. 3 - 4:

ItemDesignation

1 Serrated lock washer M5

2 Screw M5x45 A2 DIN912 TORX 25

3 Device bracket

Designation	Ord. No.
Device bracket SPS	3452 1127

Screws

(see „Service Parts and Screw Kit“ ➨ S. 3 - 2)

Disassembly

1. Loosen five screws (Abb.: 3 - 4 / Item 2) and remove screws together with the serrated lock washers (Abb.: 3 - 4 / Item 1) and the device bracket (Abb.: 3 - 4 / Item 3).

3.6 Power Supply

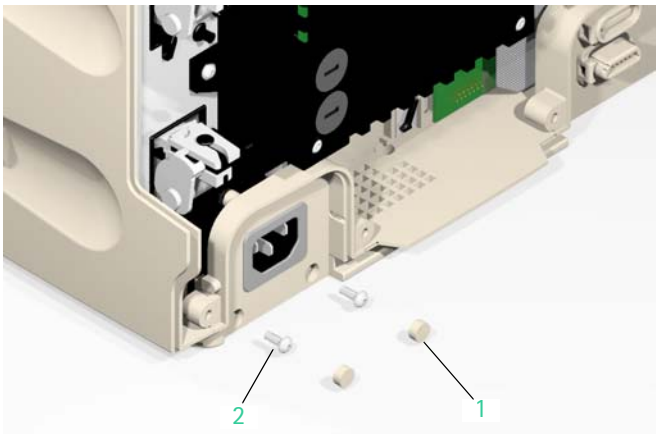


Abb.: 3 - 5

Legende zu Abb. 3 - 5:

ItemDesignation

1 Cover cap

2 Screw EJOT 30x9 WN 5452 TORX 10IP A2

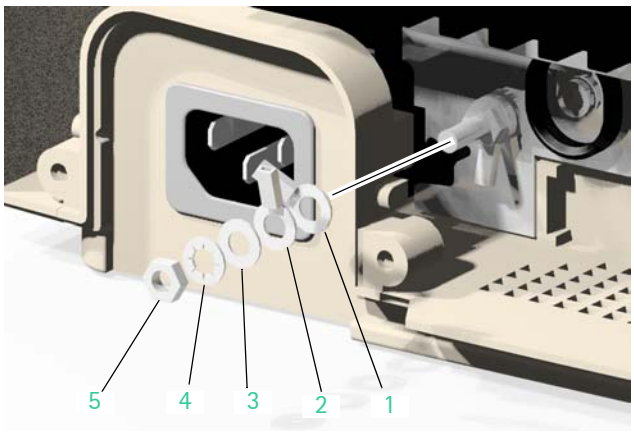


Abb.: 3 - 6

Legende zu Abb. 3 - 6:

ItemDesignation

1 Cable lug for connection to the power supply

2 Cable lug for connection to connector "F1B"

3 Washer M4

4 Serrated lock washer M4

5 Nut M4

Designation	Ord. No.
Power supply SPS	3452 1097
Connector holder, mains, SPS	3452 1143

Cover cap, screws, washer,
serrated lock washers and nuts
(see „Service Parts and Screw Kit" ➡ S. 3 - 2)

Mains seal, bottom
(see „Service Parts and Screw Kit" ➡ S. 3 - 2)

Disassembly

1. Pierce two cover caps (Abb.: 3 - 5 / Item 1) with a screwdriver and pull caps out.
2. Unscrew two screws (Abb.: 3 - 5 / Item 2) and remove them from the mains connector holder.

Note

Note the position of the protective conductor cable on the grounding bolt.

3. Loosen the nut (Abb.: 3 - 6 / Item 5) and remove nut together with the serrated lock washer (Abb.: 3 - 6 / Item 4), washer (Abb.: 3 - 6 / Item 3), the protective conductor cable to the power supply (Abb.: 3 - 6 / Item 1) and the protective conductor cable to connector "F1B" (Abb.: 3 - 6 / Item 2) from the grounding bolt.

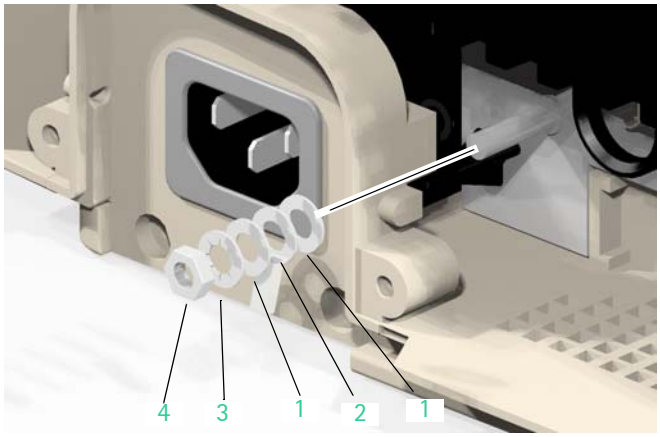


Abb.: 3 - 7

Legende zu Abb. 3 - 7:

Item	Designation
1	Washer M4
2	Cable lug for connection to connector "F1A"
3	Serrated lock washer M4
4	Nut M4

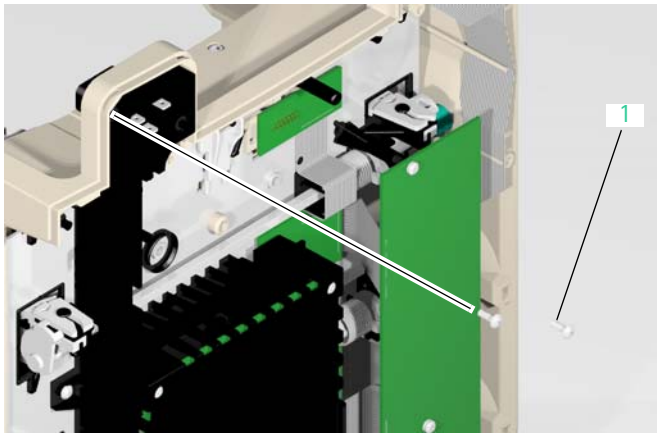


Abb.: 3 - 8

Legende zu Abb. 3 - 8:

Item	Designation
1	Screw EJOT 30x9 WN 5452 TORX 10IP A2

4. Loosen the nut (Abb.: 3 - 7 / Item 4) and remove nut together with the serrated lock washer (Abb.: 3 - 7 / Item 3), washers (Abb.: 3 - 7 / Item 1) and the protective conductor cable to connector "F1A" (Abb.: 3 - 7 / Item 2) from the grounding bolt.
5. Carefully pull off the connector of the power supply wires from the interface board.

Note

Note or mark the polarity.

6. Loosen two screws (Abb.: 3 - 8 / Item 1) and take them out of the power supply housing (connector).

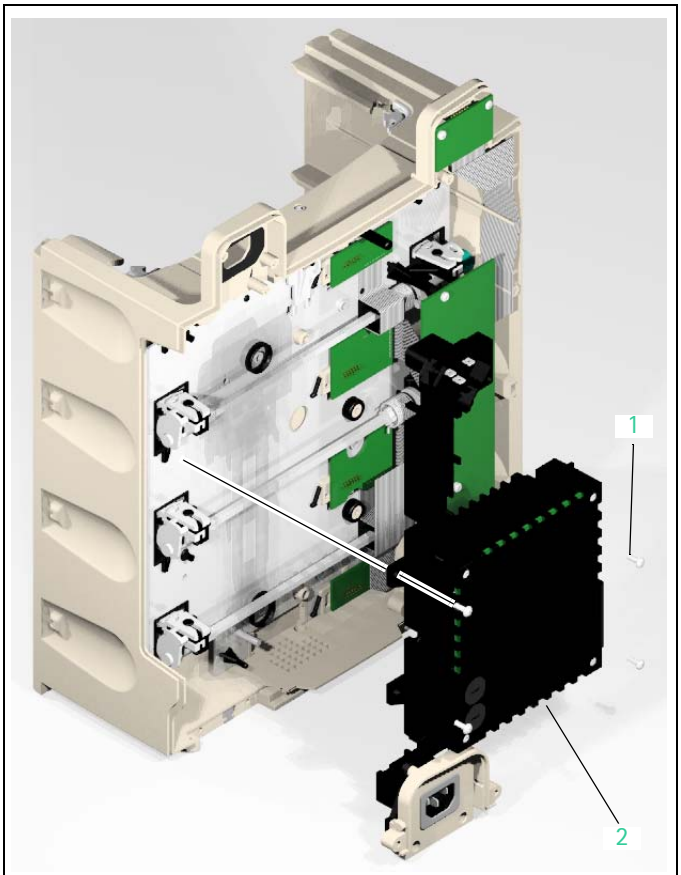


Abb.: 3 - 9

Legende zu Abb. 3 - 9:

Item	Designation
1	Screw EJOT 30x12 WN 5451 TORX 10IP A2
2	Power supply

7. Loosen four screws (Abb.: 3 - 9 / Item 1) and take the power supply (Abb.: 3 - 9 / Item 2) with the mains connector holder out of the housing.

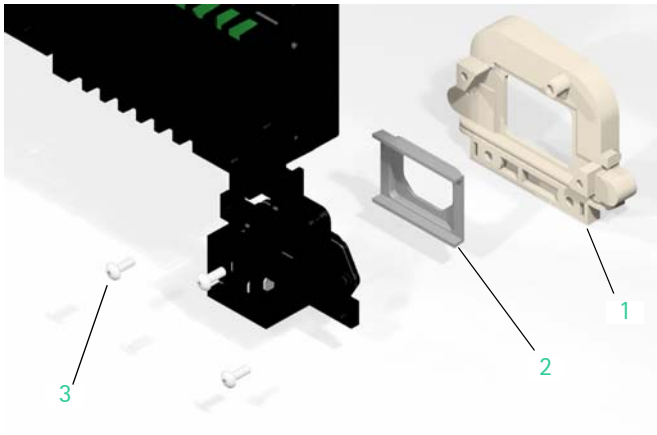


Abb.: 3 - 10

Legende zu Abb. 3 - 10:

ItemDesignation

1 Mains connector holder

2 Mains seal F1A

3 Screw EJOT 30x9 WN 5452 TORX 10IP A2

Disassembly

1. Loosen three screws (Abb.: 3 - 10 / Item 3) and remove screws together with the mains connector holder (Abb.: 3 - 10 / Item 1) and the mains seal F1A (Abb.: 3 - 10 / Item 2) from the power supply.

3.7 Release Button

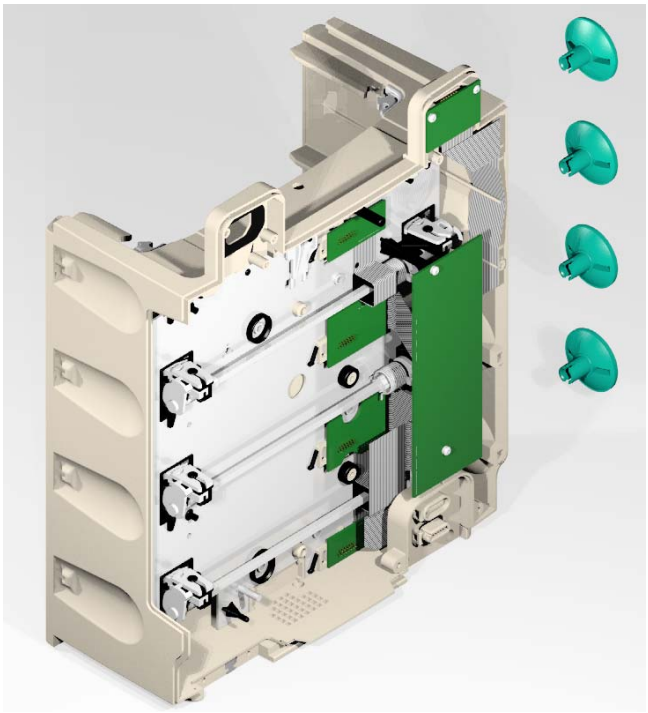


Abb.: 3 - 11

Legende zu Abb. 3 - 11:

Item	Designation
1	Release button

Designation **Ord. No.**

Release button and release seal

(see „Service Parts and Screw Kit“ ➨ S. 3 - 2)

Disassembly

1. Press four release buttons (Abb.: 3 - 11 / Item 1) carefully from the inside from the locking shaft using a screwdriver and pull the buttons out of the housing.

Note

Check the release buttons for damage, especially within the notch area, before fitting the buttons.

3.8 Interface Board / Module Lock

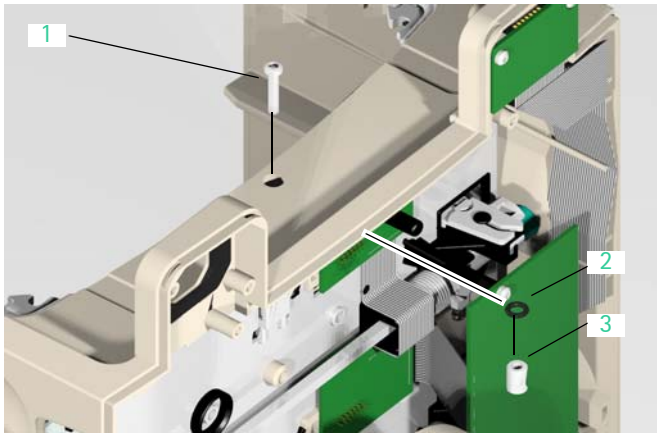


Abb.: 3 - 12

Legende zu Abb. 3 - 12:

ItemDesignation

1 Module lock screw

2 O-Ring 6.07 x x1.78

3 Module lock sleeve

Designation	Ord. No.
Interface board SPS with connectors	3452 1100
Connector holder, data, SPS	3452 1160
Module lock SPS	3452 1119
Cover cap, screws, insulating washers, O-rings (see „Service Parts and Screw Kit" ➨ S. 3 - 2)	

Disassembly

1. Move the lock towards the SpaceCover or another SpaceStation in the closed position.
2. Loosen one screw (Abb.: 3 - 12 / Item 1) of the module lock and remove it out of the housing.
3. Pull the module lock sleeve (Abb.: 3 - 12 / Item 3) out of the housing.
4. Check the O-ring (Abb.: 3 - 12 / Item 2) for damage, and remove it out of the housing if necessary.

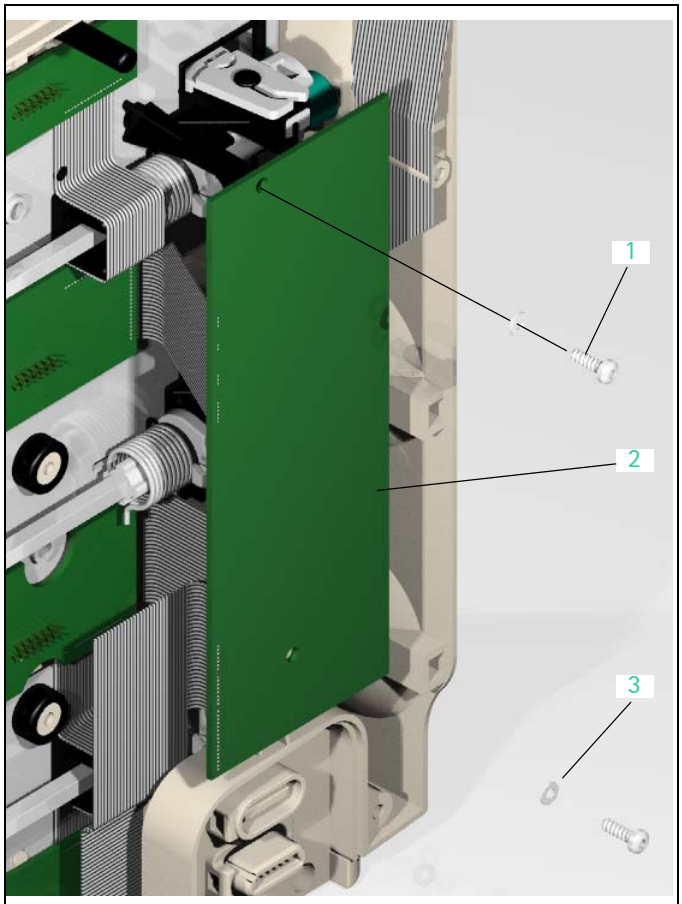


Abb.: 3 - 13

Legende zu Abb. 3 - 13:

Item	Designation
1	Screw EJOT 30x9 WN 5452 TORX 10IP A2
2	Interface board
3	Insulating washer M3

5. Loosen two screws (Abb.: 3 - 13 / Item 1) and remove screws together with the insulating washers (Abb.: 3 - 13 / Item 3) from the interface board (Abb.: 3 - 13 / Item 2).
6. Put the interface board carefully aside for all further activities.

Note

Take care not to squeeze the interface board ribbon cable.

Abb.: 3 - 14

Legende zu Abb. 3 - 14:

Item	Designation
1	Release button
2	Seal M-2K

7. Release all rotary knobs (Abb.: 3 - 14 / Item 1) of the module lock.

Note

Put a release button on the release shaft without engaging it to unlock the rotary knobs. To lock the rotary knobs press them simultaneously in by hand per slot.

8. Press 8 seals M-2K (Abb.: 3 - 14 / Item 2) carefully out of the housing, press the rotary knobs in the locking position and pull the seals M-2K off the rotary knobs.

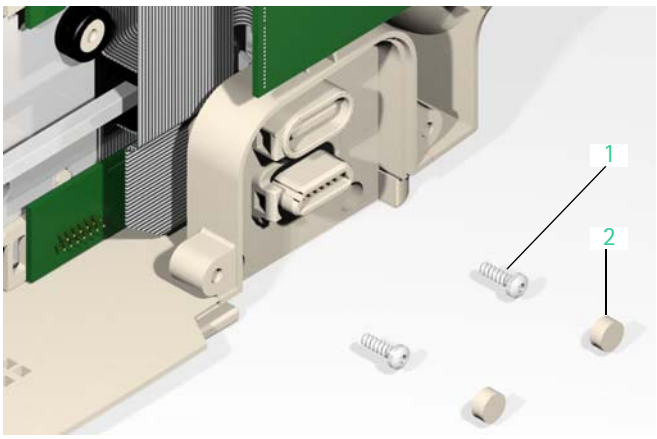


Abb.: 3 - 15

Legende zu Abb. 3 - 15:

Item	Designation
1	Screw EJOT 30x9 WN 5452 TORX 10IP A2
2	Cover cap

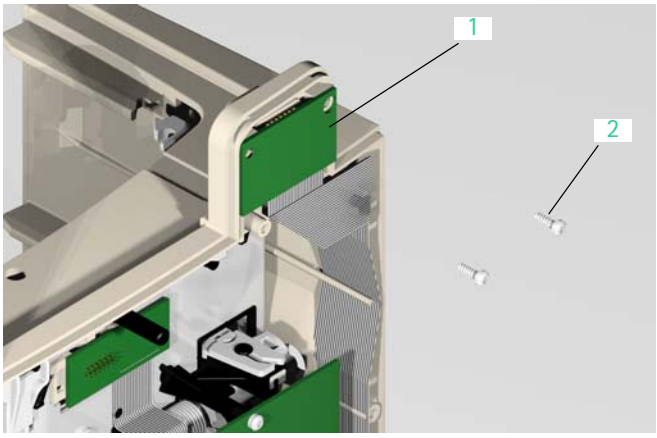


Abb.: 3 - 16

Legende zu Abb. 3 - 16:

Item	Designation
1	Connector board F5
2	Screw EJOT 30x9 WN 5452 TORX 10IP A2

9. Pierce two cover caps (Abb.: 3 - 15 / Item 2) with a screwdriver and pull caps out.
10. Loosen two screws (Abb.: 3 - 15 / Item 1) and remove them out of the data connector holder.

11. Loosen two screws (Abb.: 3 - 16 / Item 2) and remove them from the connector board F5 (Abb.: 3 - 16 / Item 1).
12. Press the connector board F5 carefully out of the housing.

Note

The connector board F5 is integrated in the interface board.

Abb.: 3 - 17

Legende zu Abb. 3 - 17:

ItemDesignation

1 Screw EJOT 30x9 WN 5452 TORX 10IP A2

2 Data connector holder

13. Loosen one screw (Abb.: 3 - 17 / Item 1) and remove it out of the data connector holder (Abb.: 3 - 17 / Item 2).

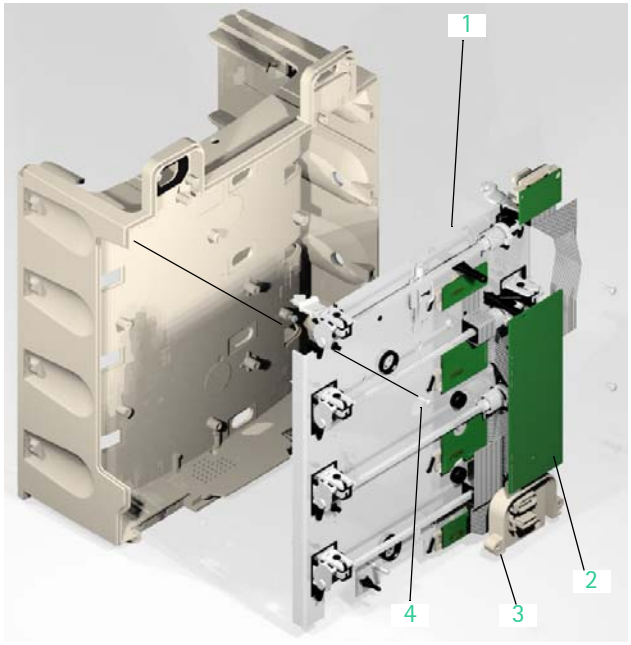


Abb.: 3 - 18

Legende zu Abb. 3 - 18:

ItemDesignation

1 Module lock

2 Interface board

3 Data connector holder

4 Screw EJOT 30x9 WN 5452 TORX 10IP A2

14. Loosen three screws (Abb.: 3 - 18 / Item 4) and remove screws together with the module lock (Abb.: 3 - 18 / Item 1), the interface board (Abb.: 3 - 18 / Item 2) and the data connector holder (Abb.: 3 - 18 / Item 3) out of the housing.

Note

Note the ribbon cable length to the interface board when dismounting the data connector holder. The ribbon cable must not be kinked.

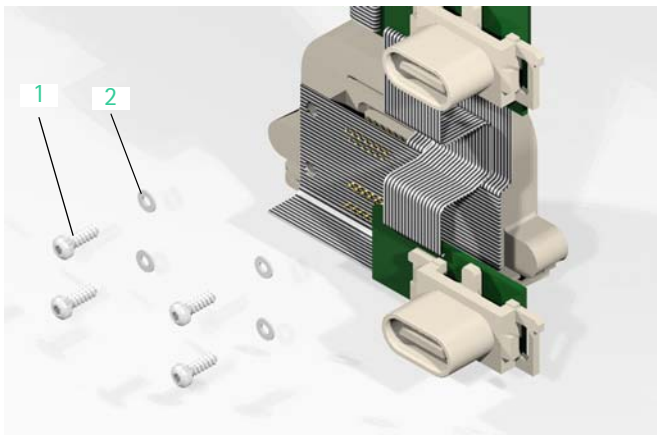


Abb.: 3 - 19

Legende zu Abb. 3 - 19:

ItemDesignation

1 Screw EJOT 30x9 WN 5452 TORX 10IP A2S

2 Insulating washer M3

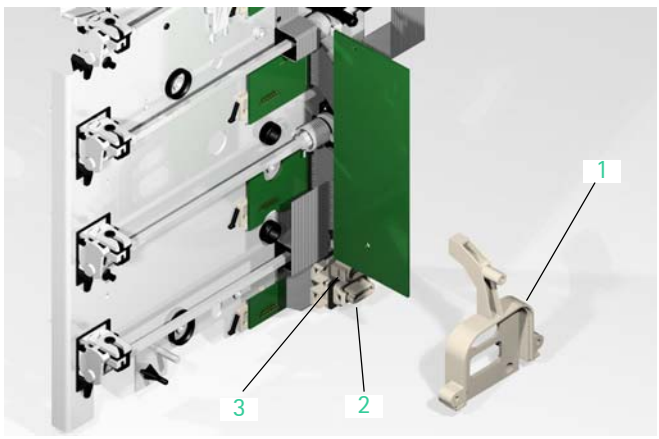


Abb.: 3 - 20

Legende zu Abb. 3 - 20:

ItemDesignation

1 Data connector holder

2 Connector F3

3 Connector F4

Disassembly

1. Loosen fours screws (Abb.: 3 - 19 / Item 1) and remove screws together with the insulating washers (Abb.: 3 - 19 / Item 2).

2. Press connectors F3 (Abb.: 3 - 20 / Item 2) and F4 (Abb.: 3 - 20 / Item 3) carefully out of the data connector holder (Abb.: 3 - 20 / Item 1).

Note

The connectors F3 and F4 are integrated in the interface board.

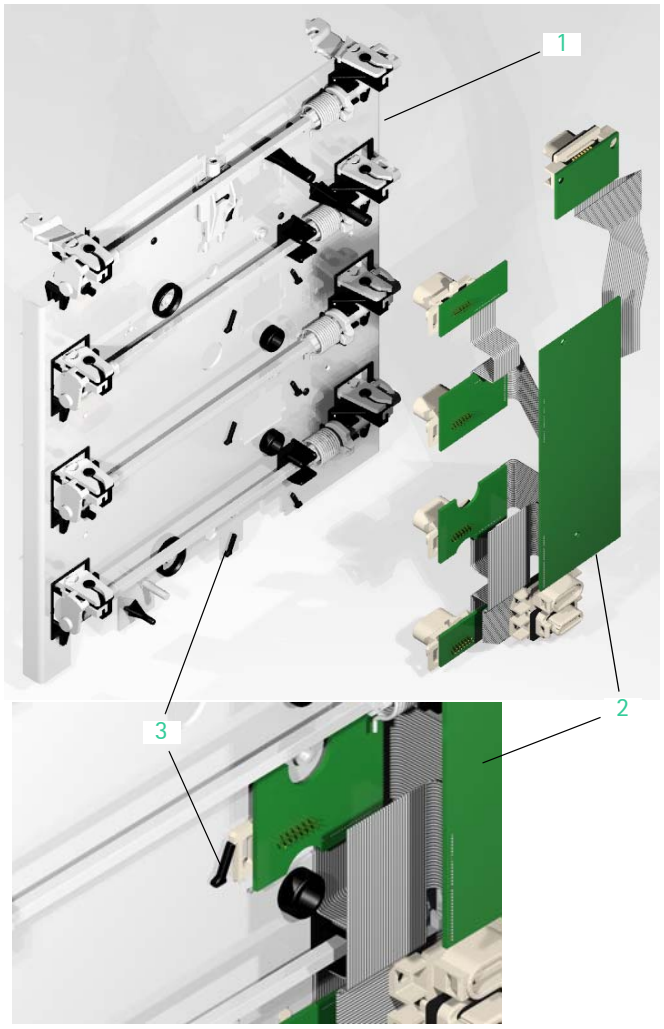


Abb.: 3 - 21

Legende zu Abb. 3 - 21:

Item	Designation
1	Module lock
2	Connector board
3	Connector board lockings

3. Press the connector board lockings (Abb.: 3 - 21 / Item 3) F2A, F2B, F2C, and F2D carefully aside, push the connectors downwards, pull them out of the module lock (Abb.: 3 - 21 / Item 1) and remove them with the interface board (Abb.: 3 - 21 / Item 2) from the module lock.

Note

The connectors F2A, F2B, F2C, and F2D are connected to each other and integrated in the interface board.

3.9 Housing

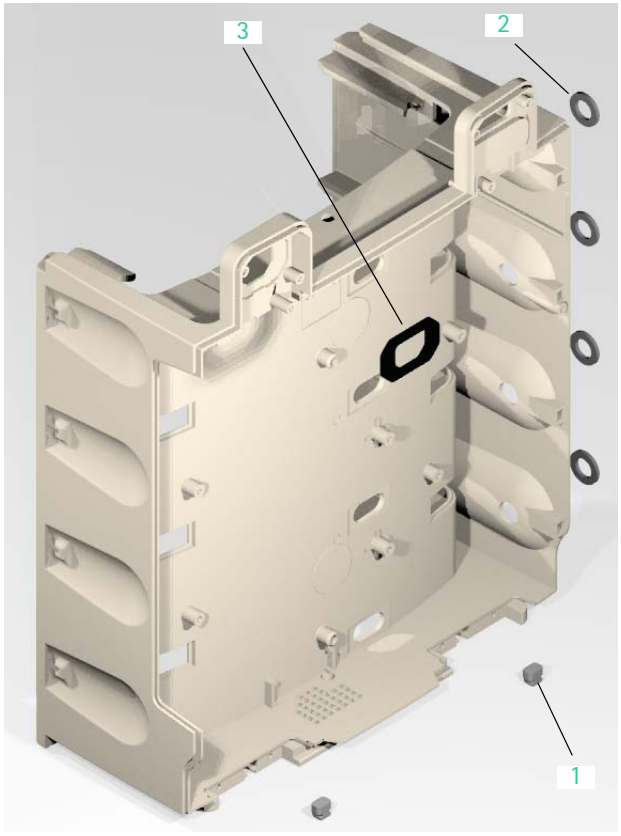


Abb.: 3 - 22

Legende zu Abb. 3 - 22:

Item	Designation
1	Housing foot SPS
2	Release seal
3	Mains sealF1B

Designation	Ord. No.
Housing SPS incl. mains seal F1B	3452 1070
Screws, seals and housing foot SPS (see „Service Parts and Screw Kit“ ➨ S. 3 - 2)	

Disassembly

1. Pull two housing feet (Abb.: 3 - 22 / Item 1) out of the housing.
2. Remove four release seals (Abb.: 3 - 22 / Item 2) from the housing.

Note

The seals are self-adhesive. Remove any adhesive residues after disassembly.

3. Remove mains seal F1B (Abb.: 3 - 22 / Item 3) out of the housing.

Note

The housing must not be disassembled further. The seals behind the corner profiles on the right and left side can only be inserted correctly by means of special tools.

3.10 Assembly / Installation

Assembly or installation of the modules and subsystems is done in reverse order of disassembly. Special steps to be observed are described hereafter in detail.

Only new cover caps are to be used.

Special Screws

Special screws for plastic housings are used in this unit. The screws are not self-cutting but produce a thread in the plastic of the housing through deformation when fitted in for the first time.

If the beginning of the thread is not engaged when the screw is fitted, a new thread is produced and the old thread is destroyed so that the security of the fixing can no longer be guaranteed.

Proceed as follows to fit the special screws:

1. Put the screw on the thread.
2. Rotate screw anti-clockwise (loosen) until a faint click can be heard. This click is produced when the screw thread drops into the existing thread.
3. Screw in the screw and tighten with the defined torque.

Interface Board / Module Lock

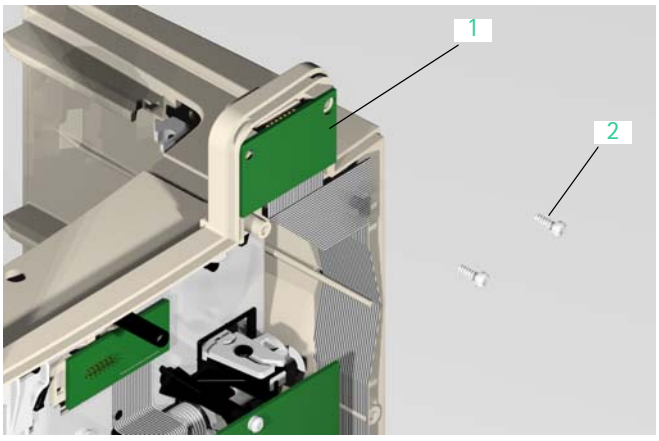


Abb.: 3 - 23

Legende zu Abb. 3 - 23:

ItemDesignation

1 Connector board F5

2 Screw EJOT 30x9 WN 5452 TORX 10IP A2

Note

Before the interface board is installed make sure that the two housing feet are inserted in the housing.

Note

When installing the interface board observe the mounting sequence, i.e. first attach the interface board to the module lock and then install the complete group in the housing.

1. Tighten the connector board screws with a torque of 0.25 to 0.05 Nm.

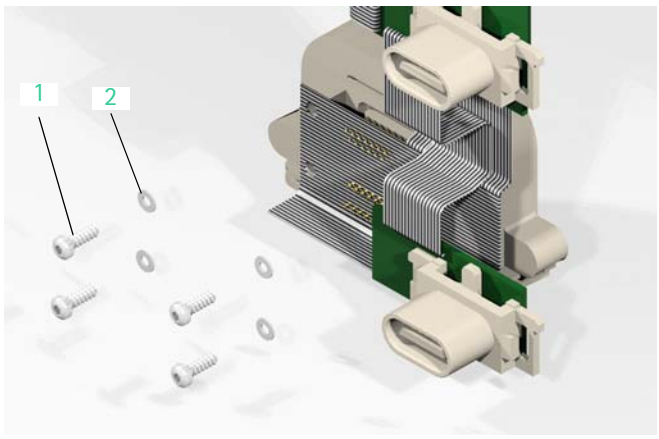


Abb.: 3 - 24

Legende zu Abb. 3 - 24:

ItemDesignation

1 Screw EJOT 30x9 WN 5452 TORX 10IP A2S

2 Insulating washer M3

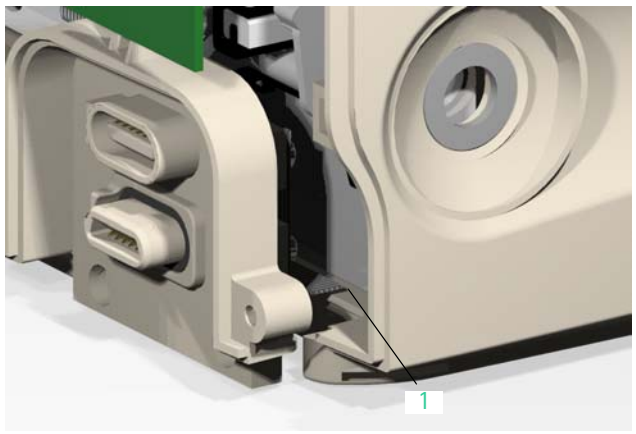


Abb.: 3 - 25

Legende zu Abb. 3 - 25:

ItemDesignation

1 Rubber cable

2. Tighten the data connector holder screws to connectors F3 and F4 with a torque of 0.25 – 0.05 Nm.

3. Install the subsystem interface board / module lock in the housing in such a way that the rubber cable lies in the housing bottom.

CAUTION

When mounting the data connector holder make sure that the rubber cable is not squeezed between the housing and the connector holder. This would result in an incorrect sealing of the housing and damage to the rubber cable.

Abb.: 3 - 26

Legende zu Abb. 3 - 26:

ItemDesignation

1 Screw EJOT 30x9 WN 5452 TORX 10IP A2

2 Data connector holder

4. Tighten the data connector holder screw with a torque of 0.25 – 0.05 Nm.
5. Before fitting the M-2K seals check them for damage and replace if necessary.

Release Button

Note

Check the release buttons for damage, especially within the notch area, before fitting the buttons.

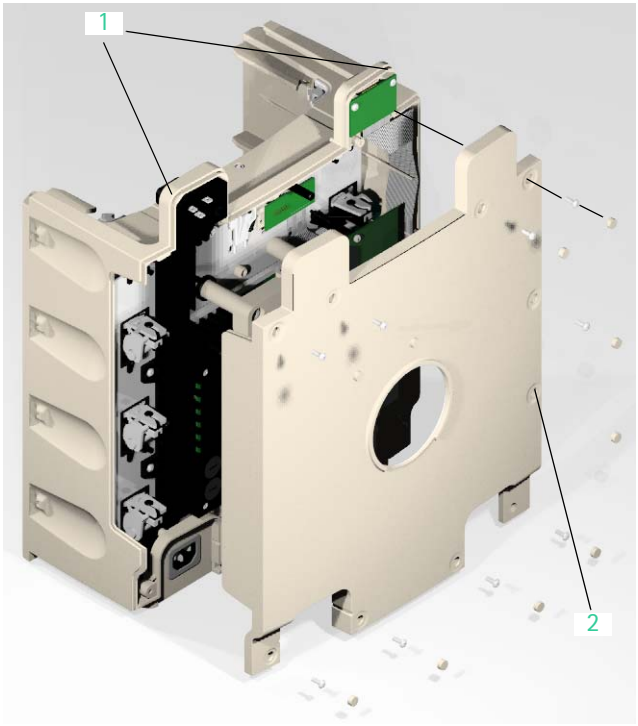


Abb.: 3 - 27

Legende zu Abb. 3 - 27:

ItemDesignation

1 Housing notch

2 Empty mounting hole

Housing Back Panel

1. Insert the housing back panel on the notches at the two connector coverings into the housing and rotate the back panel in its final position.
2. No screw is inserted in the third mounting hole (from the top) on the right-hand side of the back panel. The hole must be covered with a cover cap.

3.11 Checks after Repair

1. Check the device to ensure safe functionality of the unit (see „Device Check" ➨ S. 2 - 4).
2. Depending on the work carried out the specific steps of the TSC must be performed (see „Technical Safety Check (TSC)" ➨ S. 7 - 1).
3. The activities carried out must be recorded in the following check list.

Check List for Checks after Repair

Visual Inspection	Electrical Safety according to IEC / EN 60601-1 or VDE 0750 and VDE 0751	Functional Inspection
❒ Cleanliness ❒ Completeness ❒ Damage and faults affecting safety ❒ Damage to and readability of the label ❒ Cover caps ❒ Connectors ❒ Well running and sealing of the module lock ❒ Mains cable ❒ Accessories	❒ Mains voltage according to the TSC ❒ Protective conductor resistance according to the TSC ❒ Earth leakage current according to the TSC	❒ Locking with second SPS ❒ Pump locking of all slots Connect unit to mains. General functional check with SpaceCover comfort and pump of every slot. ❒ Voltage supply of all slots ❒ Alarm transmission ❒ Staff call transmission

For your information:

Disassembly / Assembly SpaceCom 4

4.1 General on the SpaceStation with SpaceCom

Remarks on Disassembly / Assembly of the SpaceStation with SpaceCom

WARNING

DURING DISASSEMBLY AND ASSEMBLY THE OPERATOR/SERVICE TECHNICIAN MUST WORK WITH VOLTAGES UP TO 115 / 230 V AC. THESE VOLTAGES MAY CAUSE INJURIES WHICH ARE DANGEROUS TO LIFE AND LIMB. THE NATIONAL AND INTERNATIONAL SAFETY REGULATIONS ARE TO BE ADHERED TO. THE MAINS CABLE IS TO BE REMOVED.

Before disassembling the unit, the system must be checked (see „Device Check" ➨ S. 2 - 4) to isolate the part to be exchanged.

All necessary steps to disassemble or dismount the complete unit with all its subsystems and spare parts of the SpaceCom are detailed in the following description. All further disassembly- and assembly steps correspond to the SpaceStation without SpaceCom and are decribed in Chapter „Disassembly / Assembly SpaceStation" (➨ S. 3 - 1). Steps that are not necessary can be skipped.

Note

Special screws for plastic housings are used in this unit. Pay attention to the corresponding notes when you fit the screws.

Service Parts and Screw Kit

All small parts, such as cover caps, are contained in a SpaceStation service part kit.

Designation	Ord. No.
Service part kit SpaceStation	3477 4335

with:
- Release button
- Release seal
- Seal M-2K
- Cover cap for housing
- Cover cap for handle
- Housing foot SPS
- Mains seal F1A
- Pole clamp lever
- Pole clamp spring
- O-ring 6.07 x 1.78
- O-ring 12.0 x 2.0

All screws used in the device are included in a SpaceStation screw kit.

Designation	Ord. No.
Screw kit SpaceStation	3477 4343

- Screw EJOT 30x9 WN 5452 TORX 10IP A2
- Screw EJOT 30x12 WN 5452 TORX 10IP A2
- Screw EJOT 30x16 WN 5451 TORX 10IP A2
- Screw M5x45 A2 DIN912 TORX 25
- Countersunk screw M5x12 TORX 25
- Fillister-head screw M5x12 EN-ISO14583 A2
- Nut M4
- Insulating washer M3
- Washer M4
- Washer M5
- Serrated lock washer M4
- Serrated lock washer M5

4.2 Battery Module

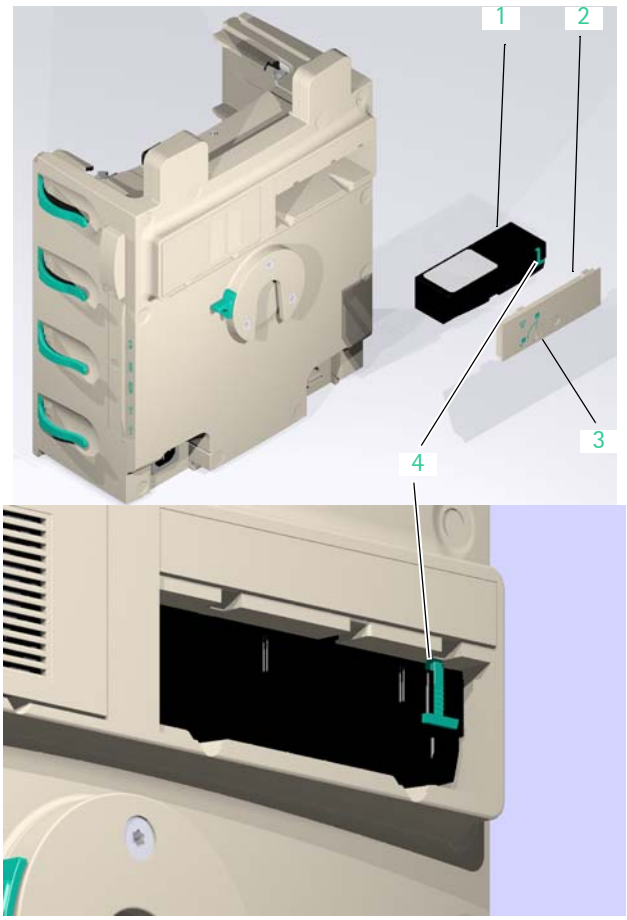


Abb.: 4 - 1

Legende zu Abb. 4 - 1:

ItemDesignation

1 Battery module

2 Battery compartment cover

3 Battery compartment cover lock

4 Battery module lock

Designation	Ord. No.
Battery pack SP (NIMH)	0871 3180
Battery compartment cover SPC	3452 1232

Disassembly

1. Rotate the lock (Abb.: 4 - 1 / Item 3) on the battery compartment cover (Abb.: 4 - 1 / Item 2) and remove the battery compartment cover.
2. Push the lock (Abb.: 4 - 1 / Item 4) on the battery module downward and remove the battery module (Abb.: 4 - 1 / Item 1) out of the battery compartment.

4.3 W-LAN Module

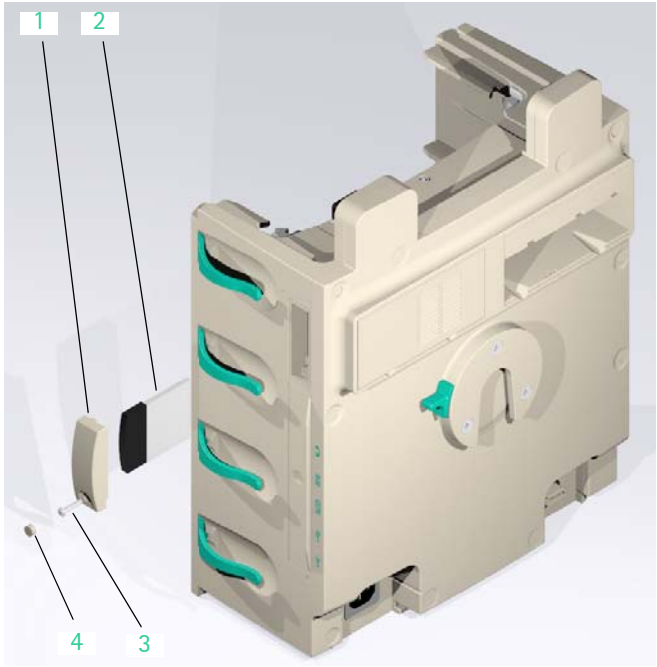


Abb.: 4 - 2

Legende zu Abb. 4 - 2:

ItemDesignation

1 W-LAN cover

2 W-LAN module

3 Screw EJOT 30x12 WN 5452 TORX 10IP A2

4 Cover cap

Designation	Ord. No.
W_LAN module	on request
W-LAN cover SPCO (with symbol)	3452 1049
W-LAN cover SPCO (without symbol)	3452 1050
Cover cap and screw	

(see „Service Parts and Screw Kit" ➨ S. 4 - 2)

Disassembly

1. Pierce cover cap (Abb.: 4 - 2 / Item 4) with a screwdriver and pull cap out.
2. Unscrew screw (Abb.: 4 - 2 / Item 3) and remove screw together with the W-LAN cover (Abb.: 4 - 2 / Item 1).
3. Pull W-LAN module (Abb.: 4 - 2 / Item 2) out of the holder.

4.4 Tube Guide

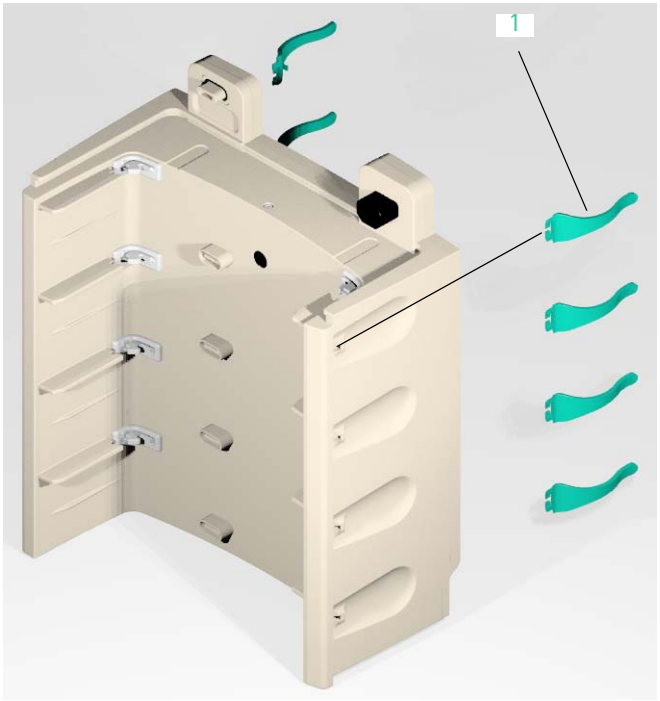


Abb.: 4 - 3

Legende zu Abb. 4 - 3:

Item	Designation
1	Tube guide

Designation	Ord. No.
Tube guide SPS (20 pieces)	3477 4394

Disassembly

1. Press the rotary knob of the tube guide out and pull the tube guide (Abb.: 4 - 3 / Item 1) out of the housing.

Note

When the tube guide is broken, remove the remaining parts from the housing.

4.5 Pole Clamp Guide

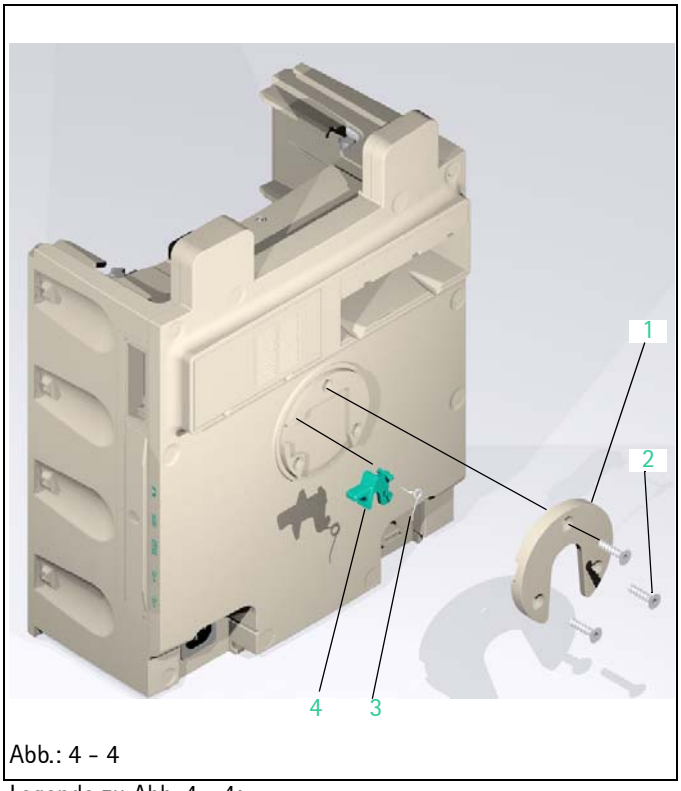


Abb.: 4 - 4

Legende zu Abb. 4 - 4:

ItemDesignation

1 Pole clamp guide

2 Countersunk screw M5x12 TORX 25

3 Pole clamp spring

4 Pole clamp lever

Designation	Ord. No.
Pole clamp guide SPS	3452 1135
Pole clamp lever (see „Service Parts and Screw Kit" ➨ S. 4 - 2)	
Pole clamp spring (see „Service Parts and Screw Kit" ➨ S. 4 - 2)	
Screws (see „Service Parts and Screw Kit" ➨ S. 4 - 2)	

Disassembly

1. Loosen three screws (Abb.: 4 - 4 / Item 2) and remove screws together with the pole clamp guide (Abb.: 4 - 4 / Item 1).
2. Remove pole clamp lever (Abb.: 4 - 4 / Item 4) and pole clamp spring (Abb.: 4 - 4 / Item 3).

4.6 Housing Back Panel

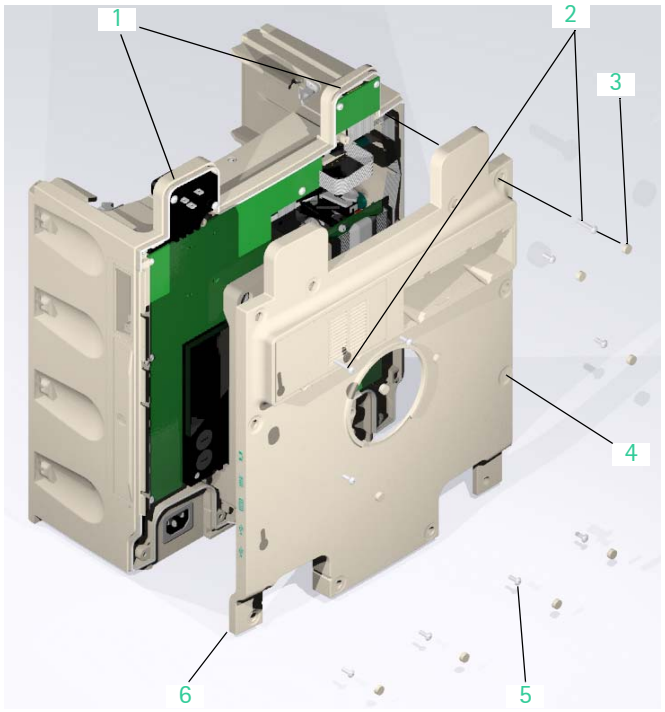


Abb.: 4 - 5

Legende zu Abb. 4 - 5:

Item	Designation
1	Housing notch
2	Screw EJOT 30x16 WN 5452 TORX 10IP A2
3	Cover cap
4	Blind plug
5	Screw EJOT 30x9 WN 5452 TORX 10IP A2
6	Housing back panel SPCO

Designation **Ord. No.**

Cover cap and screws

(see „Service Parts and Screw Kit" ➡ S. 4 - 2)

Disassembly

Note

The third cover cap on the right side of the housing back panel when viewed from above is a blind plug (Abb.: 4 - 5 / Item 4) which does not need to be removed.

1. Pierce ten cover caps (Abb.: 4 - 5 / Item 3) with a screwdriver and pull caps out.
2. Unscrew eight screws (Abb.: 4 - 5 / Item 5).
3. Unscrew two screws (Abb.: 4 - 5 / Item 2).

CAUTION

When you remove the housing back panel, pay attention to the connecting cables to the unit. They might get off.

4. Remove the back panel (Abb.: 4 - 5 / Item 6) carefully from the housing and fold aside; pay attention to the cable connections.

Note

Lift the housing back panel carefully at the bottom over the seat of the pole clamp guide, push the back panel over the housing notch (Abb.: 4 - 5 / Item 1), and fold aside.

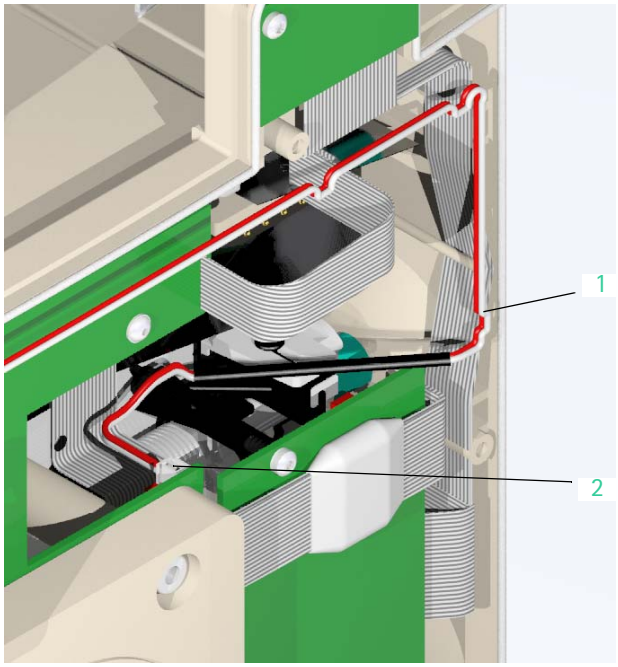


Abb.: 4 - 6

Legende zu Abb. 4 - 6:

Item	Designation
1	Fan connecting cable (presented without back panel)
2	Connector

5. Pull off connector (Abb.: 4 - 6 / Item 2) of the fan connecting cable (Abb.: 4 - 6 / Item 1) at the SPCO board.

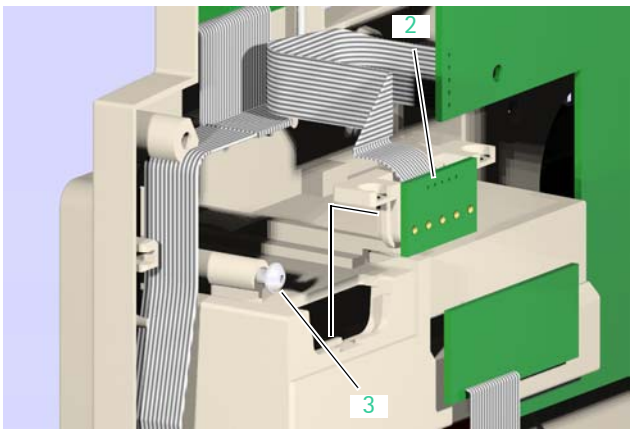


Abb.: 4 - 7

Legende zu Abb. 4 - 7:

Item	Designation
1	Contact strip
2	Screw A2 WN 5452 30x9

6. Unscrew one screw (Abb.: 4 - 7 / Item 2) and remove the contact strip (Abb.: 4 - 7 / Item 1) carefully out of the housing back panel.

Note

If necessary, the spring-mounted contact pins must be carefully inserted when the contact strip is dismounted.

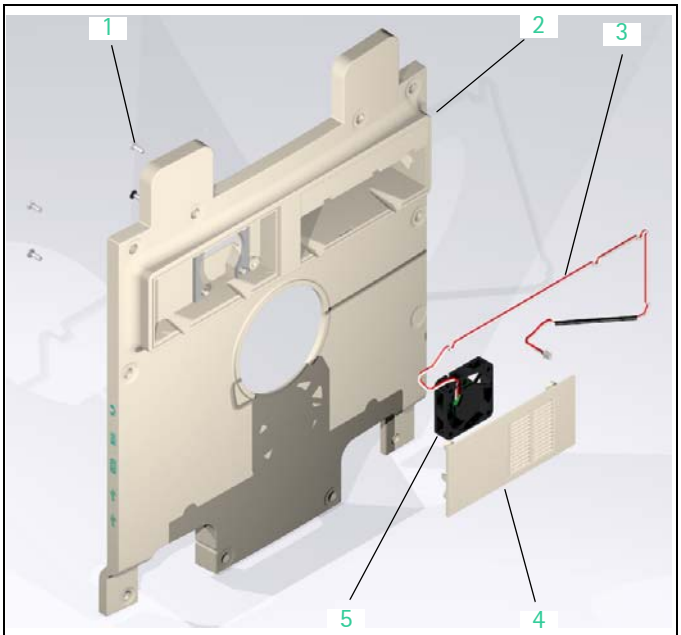


Abb.: 4 - 8

Legende zu Abb. 4 - 8:

ItemDesignation

1 Screw EJOT 30x9 WN 5452 TORX 10IP A2

2 Housing back panel SPCO

3 Fan connecting cable

4 Fan grid SPCO

5 Fan SPCO

Disassembly

Designation	**Ord. No.**
Housing back panel SPCO	3452 1052
Fan SPCO	3452 1048

Cover caps and screws

(see „Service Parts and Screw Kit" ➡ S. 4 - 2)

1. Note and outline the cable layout of the fan connecting cable (Abb.: 4 - 8 / Item 3).
2. Unscrew four screws (Abb.: 4 - 8 / Item 1).
3. Remove fan grid (Abb.: 4 - 8 / Item 4) out of the housing back panel (Abb.: 4 - 8 / Item 2).
4. Remove fan (Abb.: 4 - 8 / Item 5) out of the housing back panel.

4.7 Device Bracket

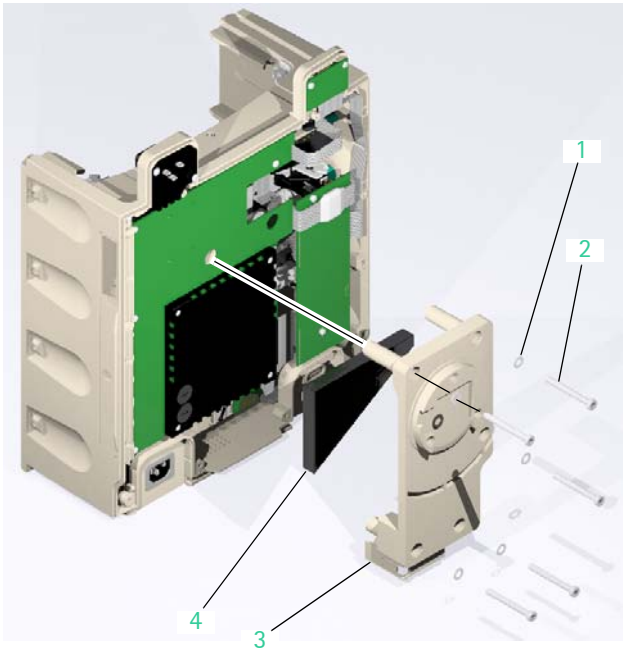


Abb.: 4 - 9

Legende zu Abb. 4 - 9:

Item	Designation
1	Serrated lock washer M5
2	Screw M5x45 A2 DIN912 TORX 25
3	Device bracket
4	Insulating hood

Designation	Ord. No.
Device bracket SPS	3452 1127
Insulating hood SPCO	3452 1043

Screws

(see „Service Parts and Screw Kit“ ➨ S. 4 - 2)

Disassembly

1. Loosen five screws (Abb.: 4 - 9 / Item 2) and remove screws together with the serrated lock washers (Abb.: 4 - 9 / Item 1) and the device bracket (Abb.: 4 - 9 / Item 3).
2. Remove insulating hood (Abb.: 4 - 9 / Item 4) from the power supply.

4.8 SPCO PCB

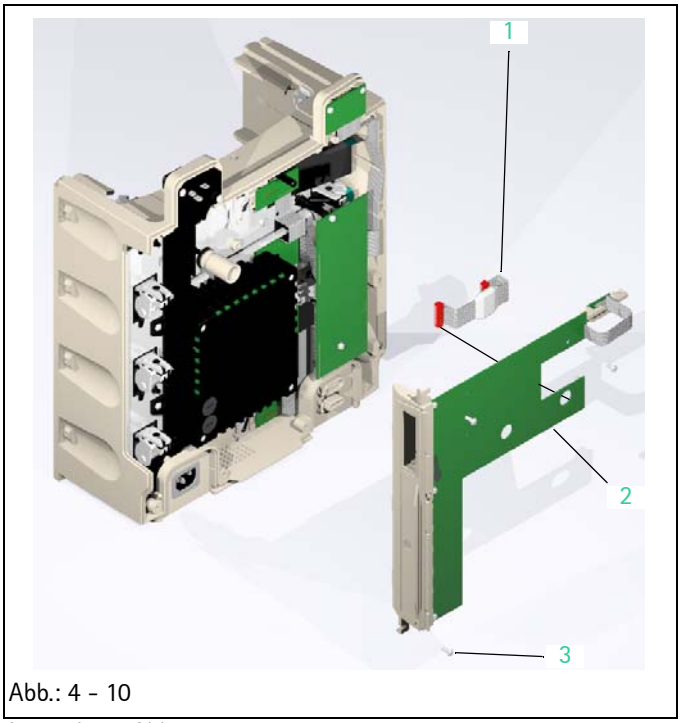


Abb.: 4 - 10

Legende zu Abb. 4 - 10:

Item Designation

1 SPCO connecting cable

2 SPCO PCB

3 Screw EJOT 30x9 WN 5452 TORX 10IP A2

Designation	Ord. No.
SPCO PCB	3452 1053
SPCO connecting cable	3452 1042
SPCO insulating piece	3452 1044
SPCO fastening sleeve	3452 1047

Screws

(see „Service Parts and Screw Kit" ➨ S. 4 - 2)

Disassembly

1. Unscrew two screws (Abb.: 4 - 10 / Item 3).
2. Remove SPCO PCB (Abb.: 4 - 10 / Item 2) carefully out of the housing and fold aside; pay attention to the length of the SPCO connecting cable (Abb.: 4 - 10 / Item 1).
3. Pull off the SPCO connecting cable on the SPCO PCB and remove the board out of the housing.
4. Loosen two screws of the interface board and lift the interface board carefully until the SPCO connecting cable can be pulled off.
5. Pull off the SPCO connecting cable at the interface board.

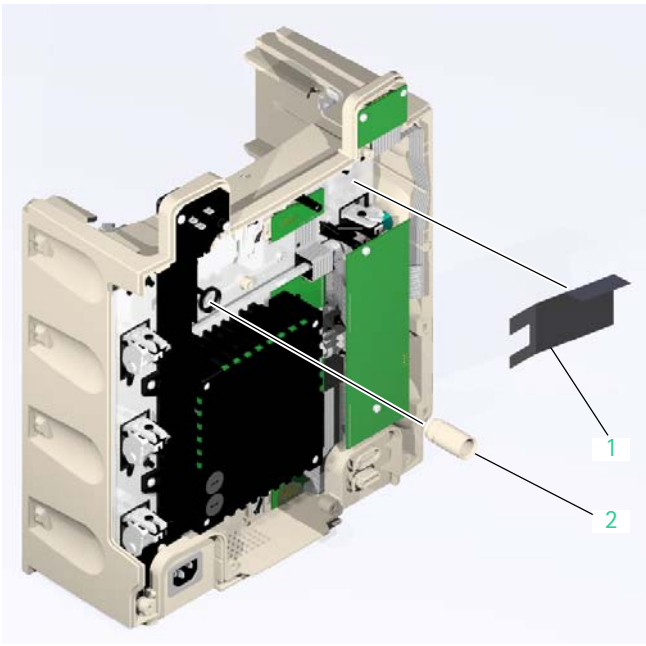


Abb.: 4 - 11

Legende zu Abb. 4 - 11:

Item	Designation
1	SPCO insulating piece
2	SPCO fastening sleeve

6. Remove the fastening sleeve (Abb.: 4 - 11 / Item 2) out of the housing.
7. Remove the insulating piece (Abb.: 4 - 11 / Item 1) under the connector board F2A.

4.9 Further Disassembly

Further disassembly of the SpaceStation is continued with the power supply and corresponds to the disassembly of a SpaceStation with SpaceCom. This disassembly is described in Chapter „Power Supply" (➨ S. 3 - 7) in more detail.

4.10 Assembly / Installation

Assembly or installation of the modules and subsystems is done in reverse order of disassembly. Special steps to be observed are described hereafter in detail.

Only new cover caps are to be used.

Special Screws

Special screws for plastic housings are used in this unit. The screws are not self-cutting but produce a thread in the plastic of the housing through deformation when fitted in for the first time.

If the beginning of the thread is not engaged when the screw is fitted, a new thread is produced and the old thread is destroyed so that the security of the fixing can no longer be guaranteed.

Proceed as follows to fit the special screws:

1. Put the screw on the thread.
2. Rotate screw anti-clockwise (loosen) until a faint click can be heard. This click is produced when the screw thread drops into the existing thread.
3. Screw in the screw and tighten with the defined torque.

Housing Back Panel

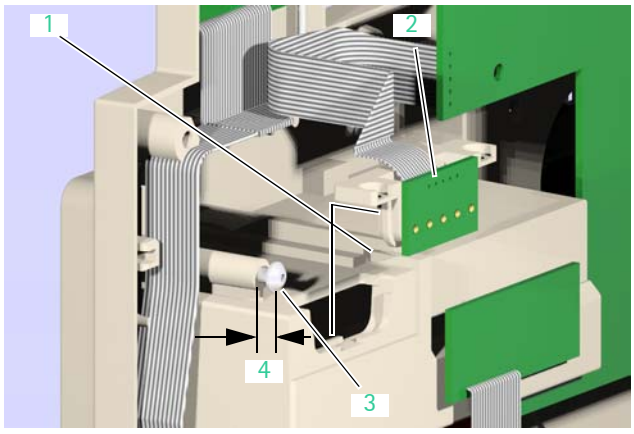


Abb.: 4 - 12

Legende zu Abb. 4 - 12:

Item	Designation
1	Groove
2	Contact strip
3	Screw A2 WN 5452 30x9
4	Spacing: 2 mm

CAUTION

When mounting the contact strip see that the springy contacts are not bent or broken.

1. Push the contact strip (Abb.: 4 - 12 / Item 2) in the groove (Abb.: 4 - 12 / Item 1) at the battery compartment of the housing back panel and tilt carefully into mounting position.
2. Secure the contact strip with a screw (Abb.: 4 - 12 / Item 3) against falling out.

Note

Screw the screw in up to a distance of about 2 mm from the screwed mandrel. This is the optimum spacing to clamp the contact strip.

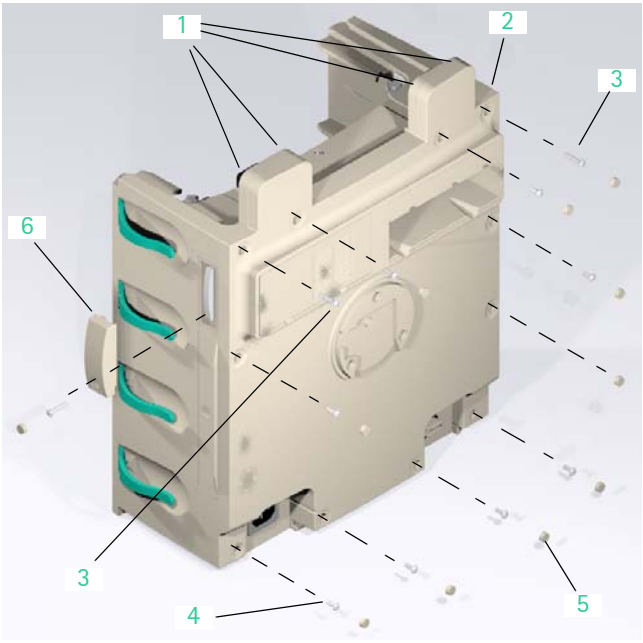


Abb.: 4 - 13

Legende zu Abb. 4 - 13:

Item	Designation
1	Locking tabs
2	Housing back panel
3	Screw A2 WN 5452 30x16
4	Screw A2 WN 5452 30x9
5	Housing cover cap
6	W-LAN cover

Note

Before the housing back panel is definitely fitted check the insulating hood and the insulating piece for proper fit and the correct cable layout of the fan cable and of the connecting cable to the battery contact strip.

3. Place on the housing back panel (Abb.: 4 - 13 / Item 2) and fasten it with the two longer screws (Abb.: 4 - 13 / Item 3) and the eight shorter screws (Abb.: 4 - 13 / Item 4).

Note

Insert the housing back panel on the notches (Abb.: 4 - 13 / Item 1) at the two connector coverings of the housing and tilt the back panel in its final position.

Note

Pay attention to the cable connections when placing on the housing back panel. These must not be squeezed.

Note

Pay attention to the different screw lengths when mounting the housing back panel. The longer screws are provided for the left-hand and right-hand upper screw opening.

4. No screw is inserted in the third mounting hole (from the top) on the right-hand side of the back panel. The hole must be covered with a cover cap.

4.11 Checks after Repair

1. Check the device to ensure safe functionality of the unit (see „Device Check“ ➨ S. 2 - 4).
2. Depending on the work carried out the specific steps of the TSC must be performed (see „Technical Safety Check (TSC)“ ➨ S. 7 - 1).
3. The activities carried out must be recorded in the following check list.

Check List for Checks after Repair

Visual Inspection	Electrical Safety according to IEC / EN 60601-1 or VDE 0750 and VDE 0751	Functional Inspection
❒ Cleanliness ❒ Completeness ❒ Damage and faults affecting safety ❒ Damage to and readability of the label ❒ Cover caps ❒ Connectors ❒ Well running and sealing of the module lock ❒ Mains cable ❒ Accessories	❒ Mains voltage according to the TSC ❒ Protective conductor resistance according to the TSC ❒ Earth leakage current according to the TSC ❒ Housing leakage current SPCO according to the TSC	❒ Locking with second SPS ❒ Pump locking of all slots Connect unit to mains. General functional check with SpaceCover comfort and pump of every slot. ❒ Fan SPCO (approx. 1 sec.) ❒ Status indicator (green) lights up ❒ Alarm indicator (red) is on for approx. 1 min. ❒ Voltage supply of all slots ❒ Alarm transmission ❒ Staff call transmission ❒ Ethernet interface (RJ 45) ❒ RS232 interface ❒ Charge state of the battery module (display on the SpaceCover comfort) ❒ Switch-over mains / battery

For your information:

Disassembly / Assembly SpaceCover 5

5.1 General

Remarks on Disassembly / Assembly

Before disassembling the unit, the system must be checked (see „Device Check" ➨ S. 2 - 4) to isolate the part to be exchanged.

All necessary steps to disassemble or dismount the complete unit with all its subsystems and spare parts of the SpaceCover standard and the SpaceCover comfort are detailed in the following description. Steps that are not necessary can be skipped.

Note

All figures in this chapter depict the SpaceCover comfort. In general, these figures also apply to the SpaceCover standard.

Note

Special screws for plastic housings are used in this unit. Pay attention to the corresponding notes when you fit the screws.

Service Parts and Screw Kit

All small parts, such as cover caps, are contained in a SpaceStation service part kit.

Designation	Ord. No.
Service part kit SpaceStation	3477 4335

with:

- Release button
- Release seal
- Seal M-2K
- Cover cap for housing
- Cover cap for handle
- Housing foot SPS
- Mains seal F1A
- Pole clamp lever
- Pole clamp spring
- O-ring 6.07 x 1.78
- O-ring 12.0 x 2.0

All screws used in the device are included in a SpaceStation screw kit.

Designation	Ord. No.
Screw kit SpaceStation	3452 1075
Screw EJOT 30x9 WN 5452 TORX 10IP A2	
Screw EJOT 30x12 WN 5452 TORX 10IP A2	
Screw EJOT 30x16 WN 5451 TORX 10IP A2	
Screw M5x45 A2 DIN912 TORX 25	
Countersunk screw M5x12 TORX 25	
Fillister-head screw M5x12 EN-ISO14583 A2	
Nut M4	
Insulating washer M3	
Washer M4	
Washer M5	
Serrated lock washer M4	
Serrated lock washer M5	

5.2 Battery Compartment Cover

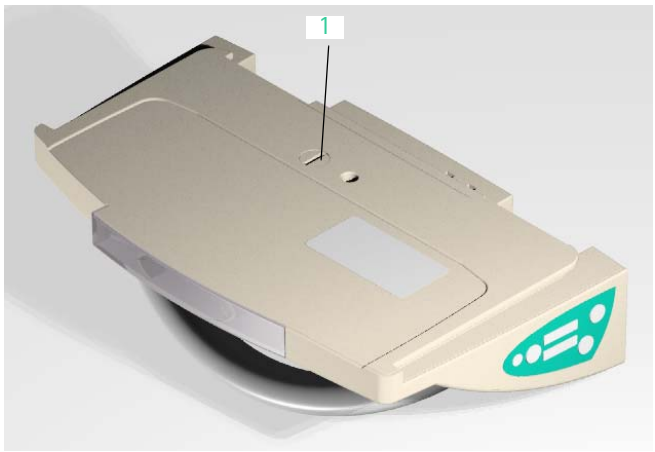


Abb.: 5 - 1

Legende zu Abb. 5 - 1:

ItemDesignation

1 Battery compartment cover lock

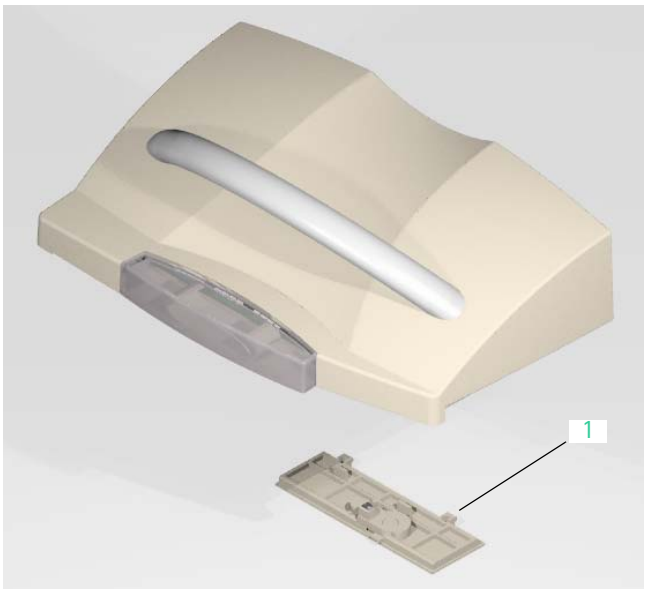


Abb.: 5 - 2

Legende zu Abb. 5 - 2:

ItemDesignation

1 Battery compartment cover

Designation **Ord. No.**

Battery compartment cover SPC. 3452 1232

Disassembly

1. Rotate the lock (Abb.: 5 - 1 / Item 1) on the battery compartment cover (Abb.: 5 - 2 / Item 1) and remove the battery compartment cover.

CAUTION

The battery module which might be installed in the SpaceCover comfort can drop out when the battery compartment cover is removed.

5.3 Battery Module

(Only SpaceCover comfort)

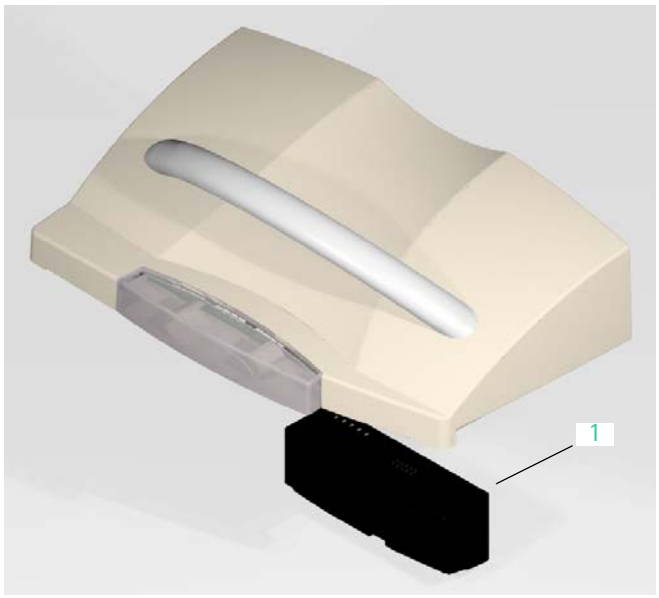


Abb.: 5 - 3

Legende zu Abb. 5 - 3:

ItemDesignation

1 Battery module (option)

Designation **Ord. No.**

Battery pack SP (NIMH) 0871 3180

Disassembly

1. Remove the battery module (option) (Abb.: 5 - 3 / Item 1) out of the battery compartment.

5.4 Handle

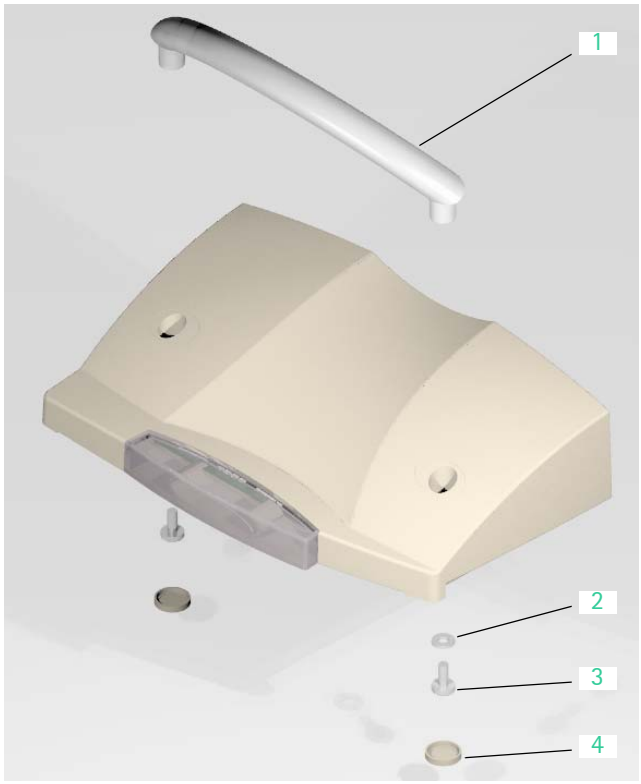


Abb.: 5 - 4

Legende zu Abb. 5 - 4:

Item	Designation
1	Handle
2	Washer M5
3	Fillister-head screw M5x12 TORX
4	Cover cap for handle

Designation	Ord. No.
Handle SPC	3452 1224

Cover caps, screws and washers

(see „Service Parts and Screw Kit“ ➡ S. 5 - 1)

Disassembly

1. Pierce two cover caps (Abb.: 5 - 4 / Item 4) on the housing bottom part with a screwdriver and pull caps out.
2. Unscrew two fillister-head screws (Abb.: 5 - 4 / Item 3) and remove screws together with washers (Abb.: 5 - 4 / Item 2).
3. Pull the handle (Abb.: 5 - 4 / Item 1) upward and out the housing upper part.

5.5 Housing Upper Part

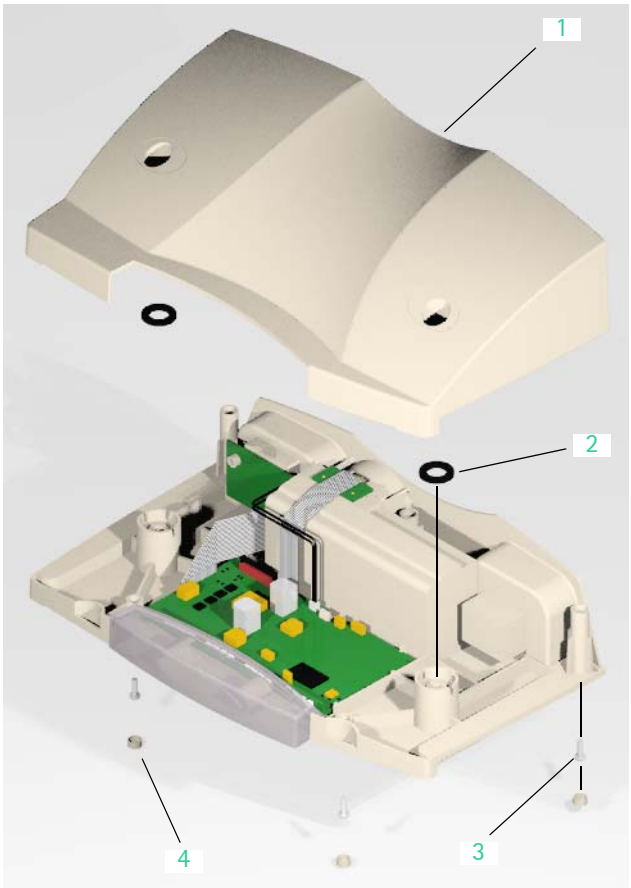


Abb.: 5 - 5

Legende zu Abb. 5 - 5:

Item	Designation
1	Housing upper part
2	Seal
3	Screw EJOT 30x9 WN 5452 TORX 10IP A2
4	Cover cap for housing

Designation	Ord. No.
Housing upper part SPCS	3452 1194
Housing upper part SPCC	3452 1178

Cover caps, screws and release seal

(see „Service Parts and Screw Kit“ ➨ S. 5 - 1)

Disassembly

1. Pierce five cover caps (Abb.: 5 - 5 / Item 4) with a screwdriver and pull caps out.
2. Unscrew five screws (Abb.: 5 - 5 / Item 3) and remove the housing upper part (Abb.: 5 - 5 / Item 1) carefully.

Note

Pay attention to the length of the rubber cable between the operator panel and the processor PCB SCc when dismounting the housing upper part of the SpaceCover comfort.

Note

Do not remove the housing back panel together with the housing upper part.

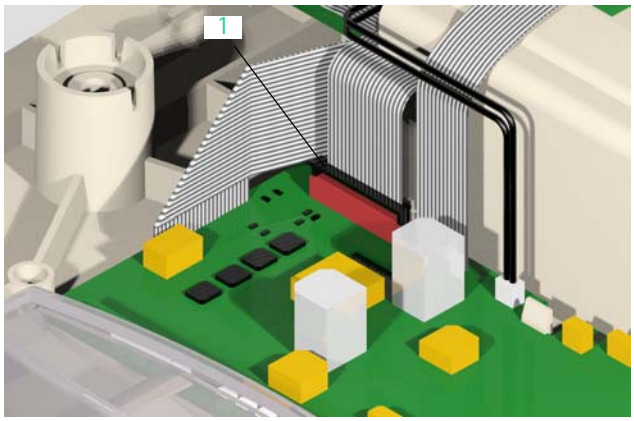


Abb.: 5 - 6

Legende zu Abb. 5 - 6:

Item	Designation
1	Connector lock

3. Pull the connector lock (Abb.: 5 - 6 / Item 1) on the processor PCB SCc upward.
4. Remove the rubber cable to the operator panel.
5. Remove two seals (Abb.: 5 - 5 / Item 2) in the housing bottom part.

5.6 Housing Back Panel

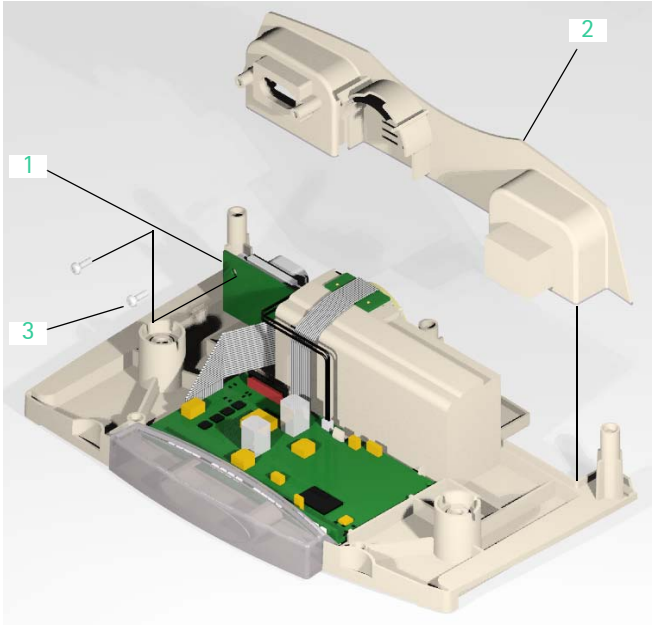


Abb.: 5 - 7

Legende zu Abb. 5 - 7:

Item	Designation
1	Connector board
2	Housing back panel
3	Screw EJOT 30x9 WN 5452 TORX 10IP A2

Designation	Ord. No.
Housing back panel SPC	3452 1216
Connector board SPCS (only for SpaceCover standard)	3452 1240

Screws

(see „Service Parts and Screw Kit“ ➨ S. 5 - 1)

Disassembly

1. Unscrew two screws (Abb.: 5 - 7 / Item 3) on the housing back panel and remove screws together with the connector board (Abb.: 5 - 7 / Item 1) (Abb.: 5 - 7 / Item 2).

Note

The connector board in the SpaceCover comfort is integrated in the SpaceCover comfort processor PCB.

2. Take the housing back panel out of the housing bottom part.

5.7 Loudspeaker

(Only SpaceCover comfort)

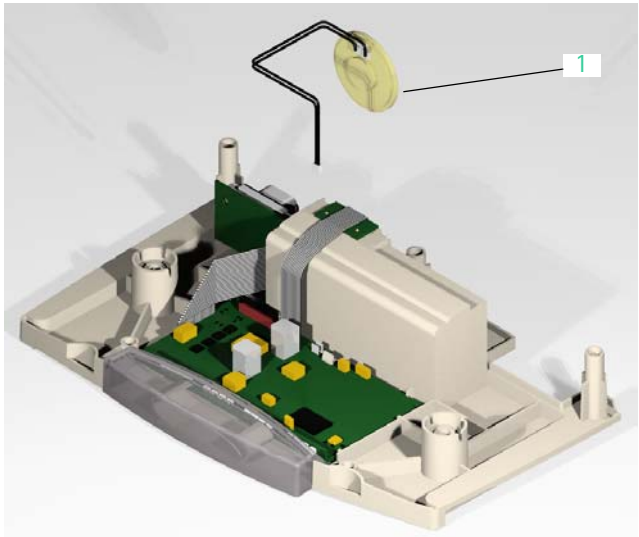


Abb.: 5 - 8

Legende zu Abb. 5 - 8:

Item	Designation
1	Loudspeaker

Designation	Ord. No.
Loudspeaker SPCC	3452 1267

Disassembly

1. Pull the loudspeaker connector (Abb.: 5 - 8 / Item 1) off the processor PCB.
2. Take the loudspeaker out of the housing bottom part.

5.8 Processor PCB

(Only SpaceCover comfort)

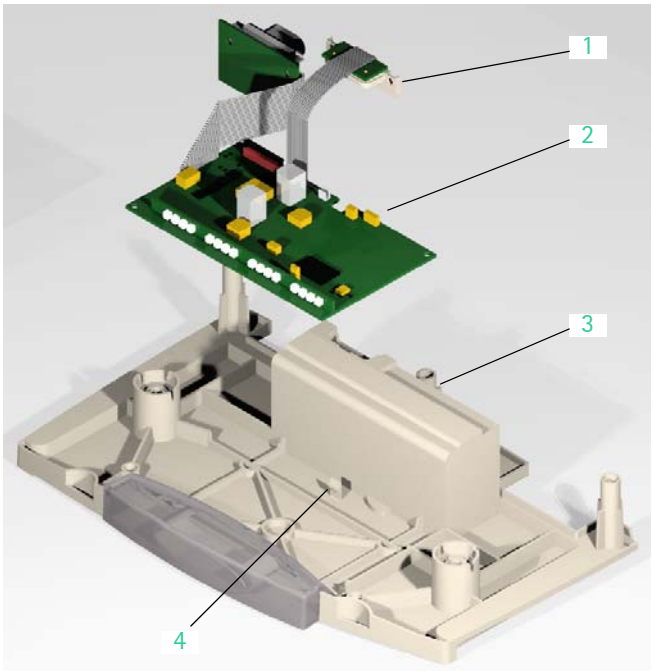


Abb.: 5 - 9

Legende zu Abb. 5 - 9:

Item	Designation
1	Contact strip
2	Processor PCB
3	Housing bottom part
4	Release button

Designation	Ord. No.
Processor PCB SPCC	3452 1259
Housing bottom part SPCS	3452 1208
Housing bottom part SPCC	3452 1186

Disassembly

1. Push the contact strip (Abb.: 5 - 9 / Item 1) to the battery module to the rear and out of the housing bottom part (Abb.: 5 - 9 / Item 3).

Note

The contact strip is integrated in the processor PCB.

2. Press the release button (Abb.: 5 - 9 / Item 4) in the housing bottom part carefully to the rear and remove the processor PCB (Abb.: 5 - 9 / Item 2) out of the housing bottom part.

5.9 Assembly / Installation

Assembly or installation of the modules and subsystems is done in reverse order of disassembly. Special steps to be observed are described hereafter in detail.

Only new cover caps are to be used.

Special Screws

Special screws for plastic housings are used in this unit. The screws are not self-cutting but produce a thread in the plastic of the housing through deformation when fitted in for the first time.

If the beginning of the thread is not engaged when the screw is fitted, a new thread is produced and the old thread is destroyed so that the security of the fixing can no longer be guaranteed.

Proceed as follows to fit the special screws:

1. Put the screw on the thread.
2. Rotate screw anti-clockwise (loosen) until a faint click can be heard. This click is produced when the screw thread drops into the existing thread.
3. Screw in the screw and tighten with the defined torque.

Housing Upper Part

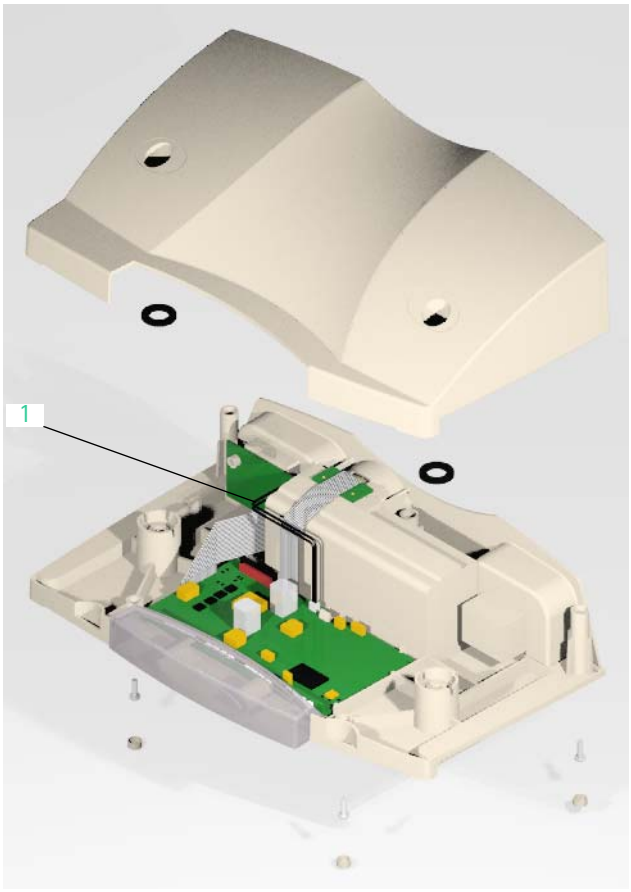


Abb.: 5 - 10

Legende zu Abb. 5 - 10:

ItemDesignation

1 Loudspeaker connecting leads

Note

Pay attention to the correct position of the loudspeaker connecting leads when mounting the housing upper part, please see Abb.: 5 - 10. The leads must point upwards.

5.10 Checks after Repair

1. Check the device to ensure safe functionality of the unit (see „Device Check" ➨ S. 2 - 4).
2. Depending on the work carried out the specific steps of the TSC must be performed (see „Technical Safety Check (TSC)" ➨ S. 7 - 1).
3. The activities carried out must be recorded in the following check list.

Check List for Checks after Repair

Visual Inspection	Electrical Safety according to IEC / EN 60601-1 or VDE 0750 and VDE 0751	Functional Inspection
❒ Cleanliness ❒ Completeness ❒ Damage and faults affecting safety ❒ Damage to and readability of the label ❒ Cover caps ❒ Connectors		❒ Locking with SPS ❒ Battery compartment cover General functional check with the SpaceStation: ❒ Self-test ❒ Alarm ❒ Loudness setting ❒ Battery charge state ❒ Switch-over mains / battery ❒ Dimming function of the status- and alarm display line

For your information:

Servicing the Unit 6

Cleaning

Clean and disinfect the SpaceStation at regular intervals. To clean the system we recommend mild soap-suds.

WARNING

WHILE CLEANING AND DISINFECTING THE SPACESTATION, DISCONNECT THE UNIT FROM THE MAINS SUPPLY.

CAUTION

Take care that no water or liquid enters the device between the housing front and back panel.

For disinfection by wiping, you should use for example Meliseptol from B. Braun. Allow the unit to dry for at least one minute. When you disinfect the device by spraying, make sure not to spray in the system openings (such as loudspeaker opening, interface connector).

The fan in the housing back panel of the SpaceStation with SpaceCom is to be vacuumed regularly. If the fan is badly soiled dismount the housing back panel and clean the fan and the area around the fan using a brush.

Servicing the Battery

The instructions for use contain a detailed description on how to service the battery.

6 Servicing the Unit

For your information:

Technical Safety Check (TSC)

Index b
(Master – to be added to the documentation)

Checklist for Technical Safety Check – Every 24 Months

Unit: SpaceStation (SPS) / SpaceStation with SpaceCom (SPCO) /
SpaceCover standard (SPCS) / SpaceCover comfort (SPCC)
Manufacturer: B. Braun Melsungen AG
Observe the Service Manual and the instructions for use. All measured values are to be documented.
Accessories used should be included in testing. Make excl. use of calibrated measuring equipment.

User

Article No.	Unit No.	Year of Procurement

Visual Inspection	Electrical Safety as per EN 60601-1 or VDE 0750 Part 1 and VDE 0751 Part 1	Functional Inspection
❒ Cleanliness, completeness, damage and legibility of the labels ❒ Pump suspension ❒ Well running and sealing of the pump lock ❒ Data and power interface (MSC connector) ❒ Interfaces SPCO ❒ Mains cable / connector and connecting line	❒ Mains voltage _____ V AC ❒ Protective conductor resistance___ Ω Unit incl. mains connecting line to mains voltage output F1B ≤ 0.2Ω ❒ Earth leakage current at NC_____ µA ≤ 30 µ A ❒ Earth leakage current at SFC_____ µA ≤ 60 µ A ❒ Housing leakage current SPCO ___ µA Metal collar Ethernet RJ45 ≤ 25 µA without SL	Switch on unit. ❒ Staff call ❒ Indicator lamps SPCC ❒ Audible alarm on SPCC ❒ Indicator lamps SPCO ❒ Functional inspection according to the instructions for use and dependent on the configuration

	Accessories Used	Units Used
	❒ _____ ❒ _____ ❒ _____	❒ Perfusor® Space, serial No.: _____ ❒ Infusomat® Space, serial No.: _____

Test result:

Defects found which could endanger patients, users or third parties: ☐ Yes ☐ No

Measures to be taken: ☐ Repair
☐ _____

Special features / documentation:

Inspection performed by:

Unit handed over on:

To:

Date / Signature:

Next deadline:

For your information:

M690 00 00 46 F04 / 3891 7548 (GB)
SpaceStation, 1.0 gb

Procedural Instructions on the TSC 8

Visual Inspection

1. Check the unit and accessories for cleanliness.
2. Check the unit and accessories for completeness and check configuration.
3. Check the unit and its accessories for damage and the labels for readability. Pay special attention to the following parts:
   a) Pump suspension
   b) Tightness of pump locks
   c) Connectors
   d) 8 tube guides
   e) Mains cable

Electrical Safety according to IEC/EN 60601-1 or VDE 0750 and VDE 0751

The values to be measured for the electrical safety are stated in the TSC (see „Technical Safety Check (TSC)" ➡ S. 7 - 1).

Protective Conductor Resistance

Note

The protective conductor resistance of each SpaceStation must be measured separately. Before carrying out the measurement remove all interface cables to the other units.

Measure between the protective conductor of the mains cable and the following parts:

- Ground contact in connector F1B (middle pin)

Earth Leakage Current

Note

Due to the technical design the patient- and housing leakage current is not to be measured on the SpaceStation without SpaceCom and without pump inserted. The earth leakage current is always measured as it is the upper limit of leakage currents which can be measured.

The earth leakage current of each SpaceStation must be measured separately.

Check

1. Before carrying out the measurement remove all interface cables to the other units.
2. Remove all pumps out of the SpaceStation.
3. Measure the earth leakage current without single fault condition (NC = Normal Condition) incl. mains cable.
4. Document value.
5. Measure the earth leakage current in single fault condition (SFC = Single Fault Condition) incl. mains cable.
6. Document value.

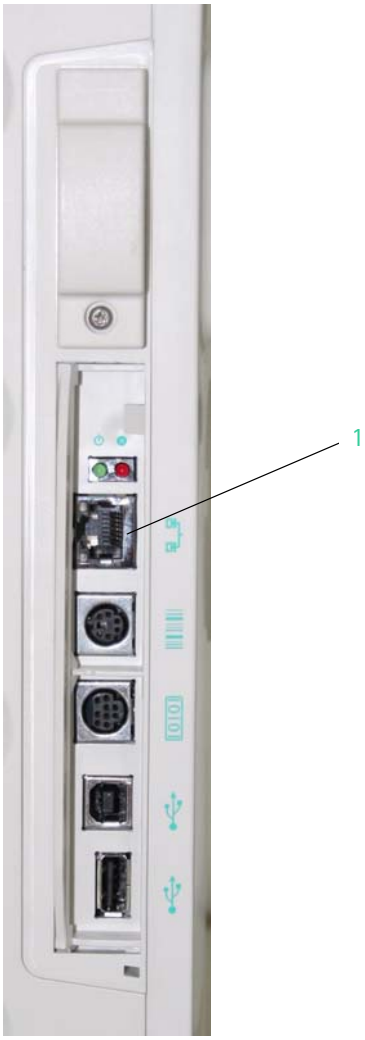


Abb.: 8 - 1

Legende zu Abb. 8 - 1:

Item	Designation
1	Metal frame of the Ethernet (RJ 45) connection

Housing Leakage Current
(with the SpaceStation with SpaceCom)

Measurement is to be carried out at nominal voltage +10% in single fault condition (SFC = Single Fault Condition) incl. mains cable.

1. Measure the housing leakage current between mains input at the mains cable and the metal frame of the Ethernet (RJ 45) connection in the SpaceCom plug strip.

Note

The metal frames of the connectors in the SpaceCom plug strip are connected with each other.

2. Document value.

Functional Inspection

Mechanical

1. Check proper functioning of the lock of all pump slots with one pump.
2. Check the battery compartment cover lock of the SpaceStation with SpaceCom for proper operation.
3. Check proper functioning of the lock to another SpaceStation or a SpaceCover.
4. Check the battery compartment cover lock of the SpaceCover comfort for proper operation.

Functional Check

1. Connect the SpaceStation to the mains.
2. In case of a SpaceStation with SpaceCom the following functions are to be checked:
   a) Fan in the housing back panel starts running for appr. 1 sec.
   b) Status indicator (green) on the SpaceCom lights up
   c) Alarm indicator (red) on the SpaceCom lights up for approx. 1 minute
3. Trigger an alarm with a pump at each slot. The red LED on the service connector SP must light up.
   When a SpaceCover comfort is fitted the alarm must also be displayed in the status- and alarm display line of the SpaceCover comfort; an audible alarm must sound.
4. Carry out a self-test of the SpaceCover comfort (actuate the On- / Off button on theSpaceCover comfort), please see instructions for use.

Battery Check of the SpaceCover comfort

1. Insert a battery module in the SpaceCover comfort. After start-up the battery charge condition is displayed in the top charge condition display of the operator and status display field of the SpaceCover comfort.
2. Disconnect the SpaceStation from the mains. An audible alarm sounds and the status display colour on the operator and status display field of the SpaceCover comfort changes from green to yellow.
3. Possible displays are shown on the SpaceCover comfort.
4. Switch the SpaceStation or the SpaceStation column on and then off via the SpaceCover comfort. A self-test is carried out.

5. Reconnect the SpaceStation to the mains. The status display colour on the operator and status display field of the SpaceCover comfort changes from yellow to green.

Interface Check of the SpaceStation with SpaceCom

1. Insert a pump in the SpaceStation.
2. Connect a PC to the SpaceStation via the interface cable RJ-45 cross-over and start the Space-Online Program (see „SpaceOnline" ➨ S. 1 - 17).
3. Check in the Service Part whether the correct pump type and its On-/Off-status are displayed.

Note

If the IP-address of the SpaceStation is unknown, all parameters can be reset to the factory settings from software version 695E010001 on via a USB-stick with the „factorydefault" directory saved here. When the word „factorydefault" is read automatically resetting of the parameters in the SpaceStation is started. The IP-address of the SpaceStation is set to 192.168.100.41.

4. Connect a PC with the SpaceStation via the interface cable RS232 SPCO (crossed) and start the BCCshow Program (see „BCCshow" ➨ S. 1 - 19).
5. Check whether the correct pump and its status are displayed on the PC.

Battery Check of the SpaceStation with SpaceCom

1. Insert one battery module in the SpaceStation and one in the SpaceCover comfort. After start-up the battery charge condition is displayed in the bottom charge condition display of the operator and status display field of the SpaceCover comfort.
2. Remove the battery module out of the SpaceCover comfort.
3. Disconnect the SpaceStation from mains when the status indicator (green) on the SpaceCom (SpaceCom is operative) lights up.
4. The status indicator (green) on the SpaceCom remains on for at least 3 seconds. The alarm indicator (red) must not light up or flash.
5. Remove the optional battery modules which are not part of the unit out of the device.

For your information:

Test Equipment and Special Tools 9

Test Equipment

Designation	Ord. No.
For Device Check	
Service-CD	0871 3301
Service connector Space	3452 1062
Interface cable RS232 SP	0871 3234
Interface cable RS232 SPCO (crossed)	0871 3237
Interface cable RJ45 cross-over	
For Repairs	
No special test equipment required.	
For the TSC	
- Measuring instrument for electrical safety	
- Service connector Space (see above)	

Special Tools

Designation	Ord. No.
TORX screwdriver kit (standard)	
5 - 10, 25	
TORX screwdriver kit (Plus)	
5 - 10, 25	
Screwdriver 6IPx60 TORX plus	4002 4806
Screwdriver 8IPx60 TORX plus	4002 4814
Screwdriver 10IPx60 TORX plus	4002 4822
Screwdriver 25IPx60 TORX plus	4002 4830
Torque wrench with TORX adapter	

9 Test Equipment and Special Tools

For your information:

Spare Parts List 10

SpaceStation, SpaceCover

Service part kit SpaceStation 3477 4335
with:
- Release button
- Release seal
- Seal M-2K
- Cover cap for housing
- Cover cap for handle
- Housing foot SPS
- Seal, mains F1A
- Pole clamp lever
- Pole clamp spring
- O-ring 6.07 x 1.78
- O-ring 12.0 x 2.0

Screw kit SpaceStation 3477 4343
- Screw EJOT 30x9 WN 5452 TORX 10IP A2
- Screw EJOT 30x12 WN 5452 TORX 10IP A2
- Screw EJOT 30x16 WN 5451 TORX 10IP A2
- Screw M5x45 A2 DIN912 TORX 25
- Countersunk screw M5x12 TORX 25
- Fillister-head screw M5x12 EN-ISO14583 A2
- Nut M4
- Insulating washer M3
- Washer M4
- Washer M5
- Serrated lock washer M4
- Serrated lock washer M5

SpaceStation without SpaceCom

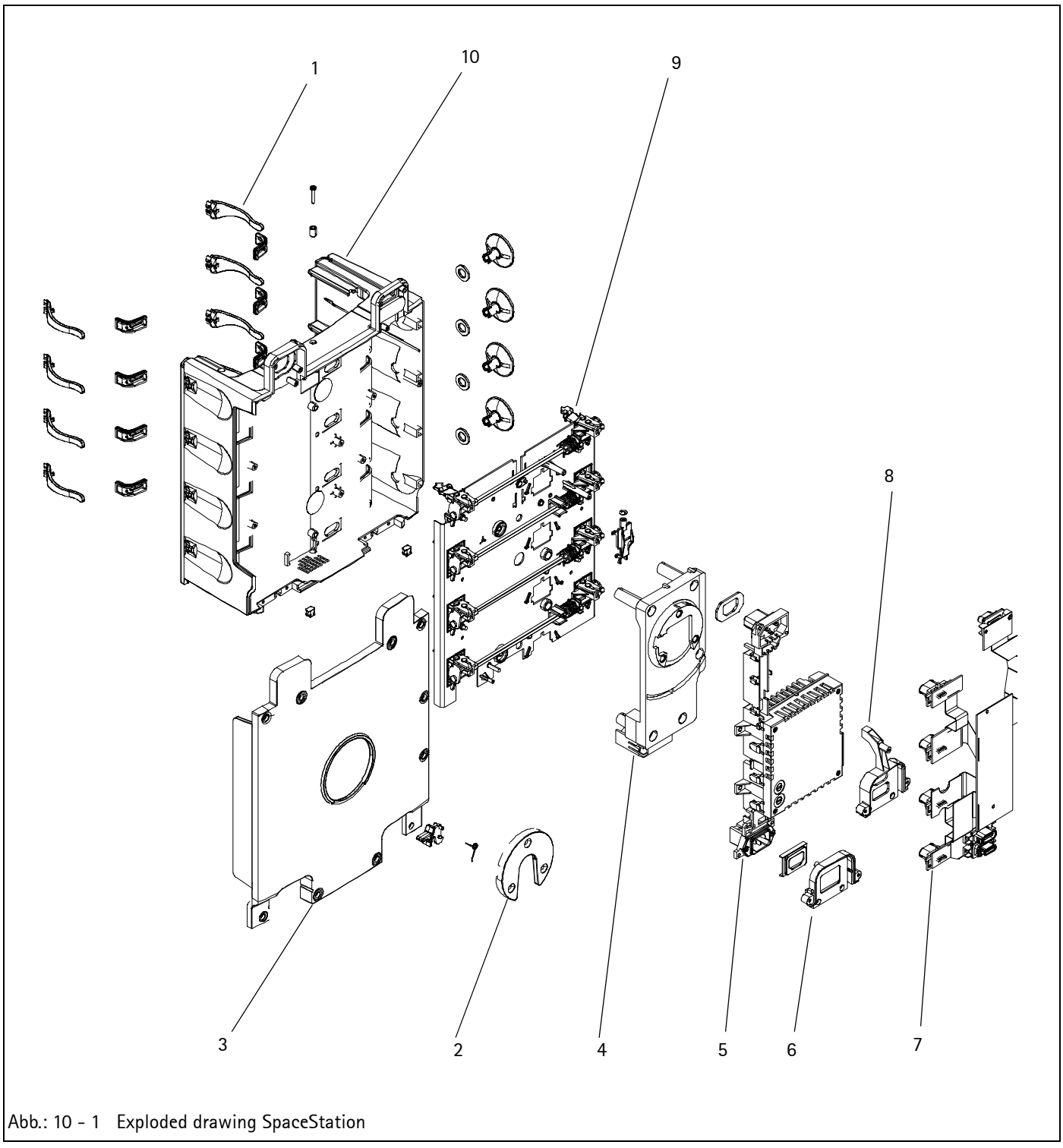


Abb.: 10 - 1 Exploded drawing SpaceStation

1	Tube guide SPS (20 pieces)	3477 4394
2	Pole clamp guide SPS	3452 1135
3	Housing back panel SPS	3452 1089
4	Device bracket SPS	3452 1127
5	Power supply SPS	3452 1097
6	Connector holder, mains, SPS	3452 1143
7	Interface board SPS with connectors	3452 1100
8	Connector holder, data, SPS	3452 1160
9	Module lock SPS	3452 1119
10	Housing SPS incl. mains seal F1B	3452 1070

SpaceStation with SpaceCom

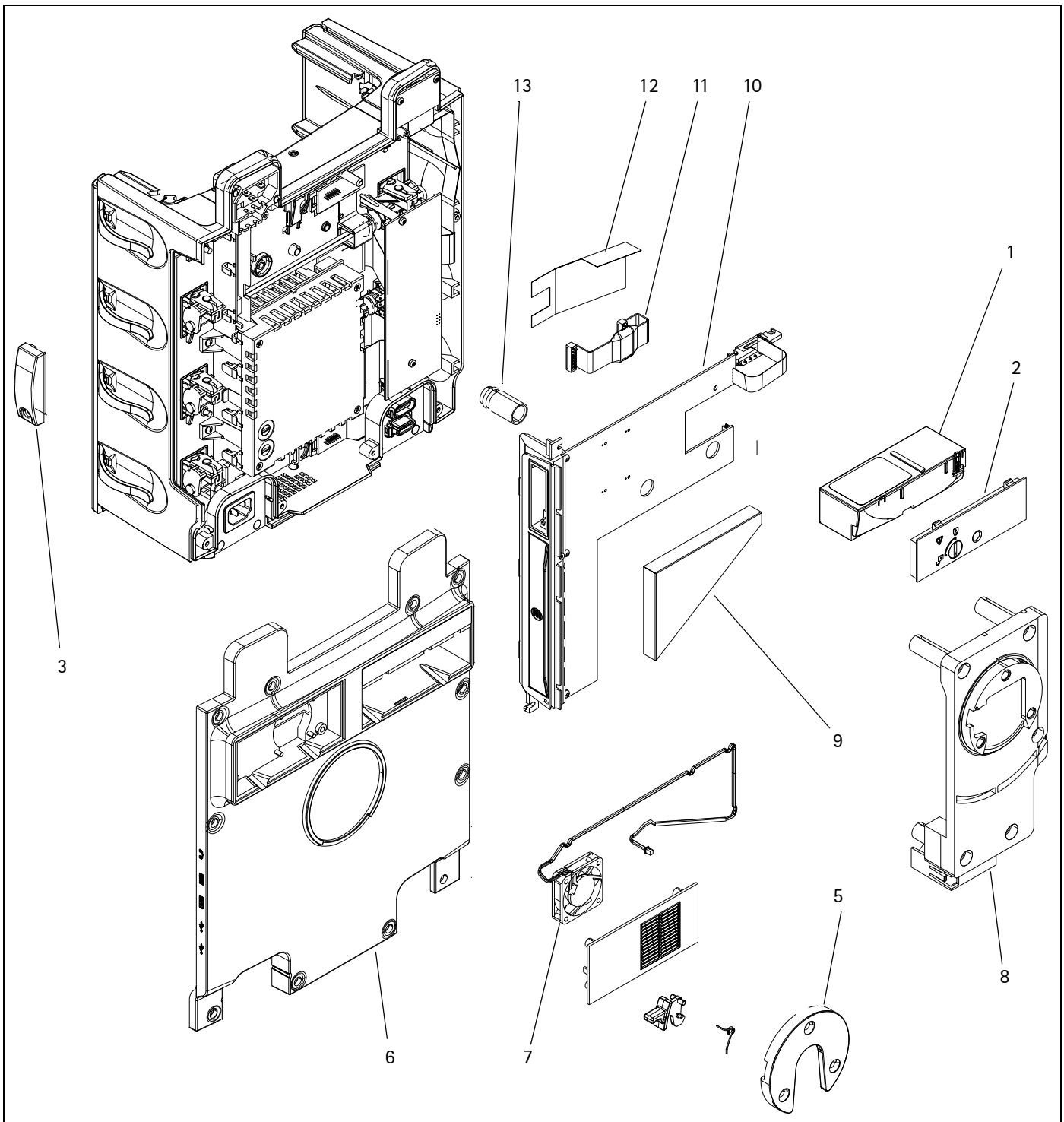


Abb.: 10 - 2 Exploded drawing SpaceCom

1	Battery pack SP (NIMH)	0871 3180
2	Battery compartment cover SPC	3452 1232
3	W-LAN cover SPCO (with symbol)	3452 1049
	W-LAN cover SPCO (without symbol)	3452 1050
4	Tube guide SPS (20 pieces)	3477 4394
5	Pole clamp guide SPS	3452 1135
6	Housing back panel SPCO	3452 1052
7	Fan SPCO	3452 1048
8	Device bracket SPS	3452 1127
9	Insulating hood SPCO	3452 1043
10	SPCO PCB	3452 1053
11	SPCO connecting cable	3452 1042
12	SPCO insulating piece	3452 1044
13	SPCO fastening sleeve	3452 1047

SpaceCover

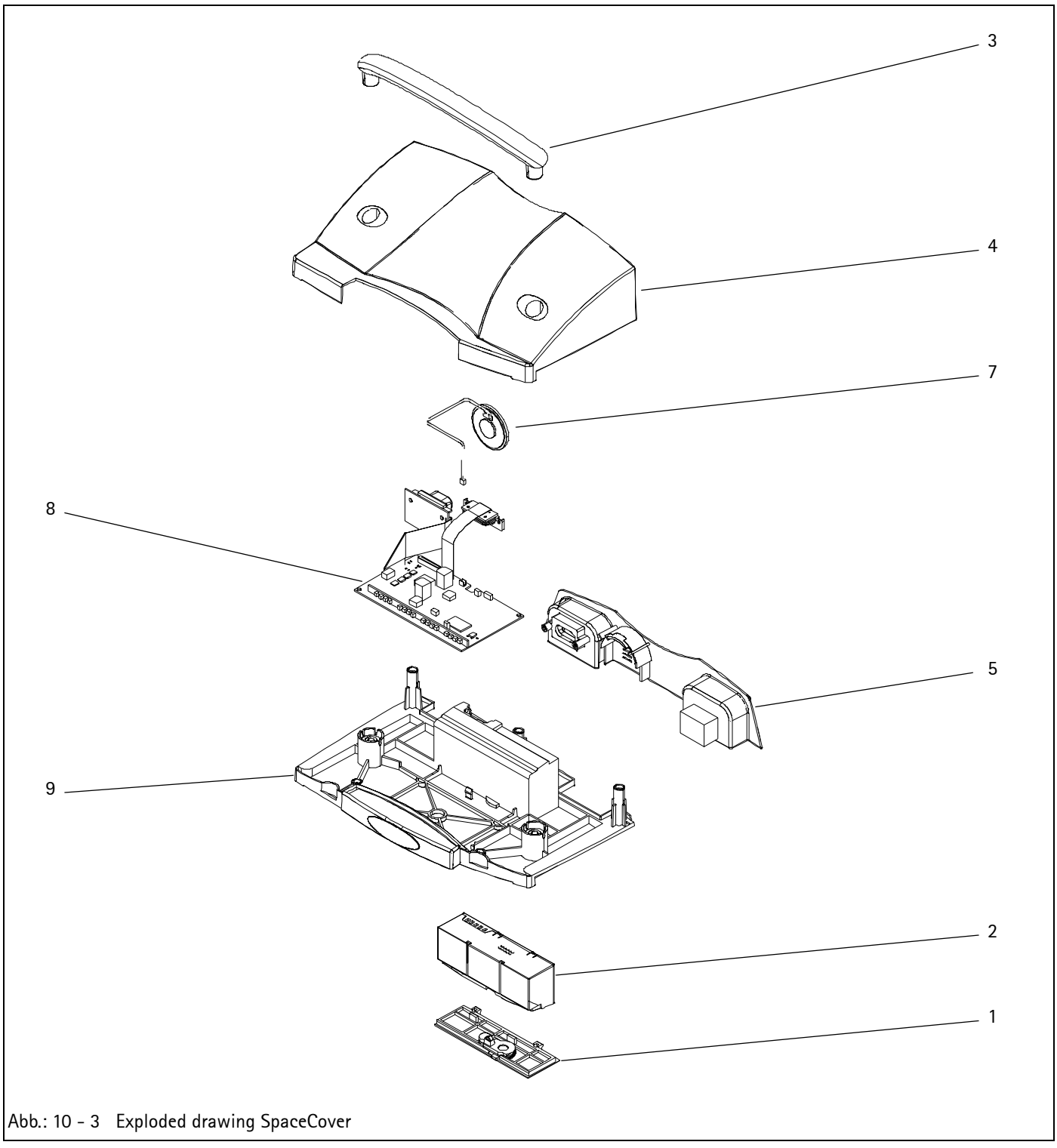


Abb.: 10 - 3 Exploded drawing SpaceCover

1	Battery compartment cover SPC	3452 1232
2	Battery pack SP (NIMH)	0871 3180
3	Handle SPC	3452 1224
4	Housing upper part SPCS	3452 1194
	Housing upper part SPCC	3452 1178
5	Housing back panel SPC	3452 1216
6	Connector board SPCS (only for SpaceCover standard)	3452 1240
7	Loudspeaker SPCC	3452 1267
8	Processor PCB SPCC	3452 1259
9	Housing bottom part SPCS	3452 1208
	Housing bottom part SPCC	3452 1186

10 Spare Parts List

Revision Documentation 11

Description of Version

Version 1.0 (Base)

- First version of this Service Manual.
- Release date: September 20, 2005.

Version 2.0

- Insertion of the SpaceStation version with SpaceCom incl. new spare parts.
- Changed TSC for the SpaceStation.
- Texts corrected
- Release date: December 14, 2006.

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